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FIG. 1A
 A SIMPLIFIED PSK TRANSMITTER

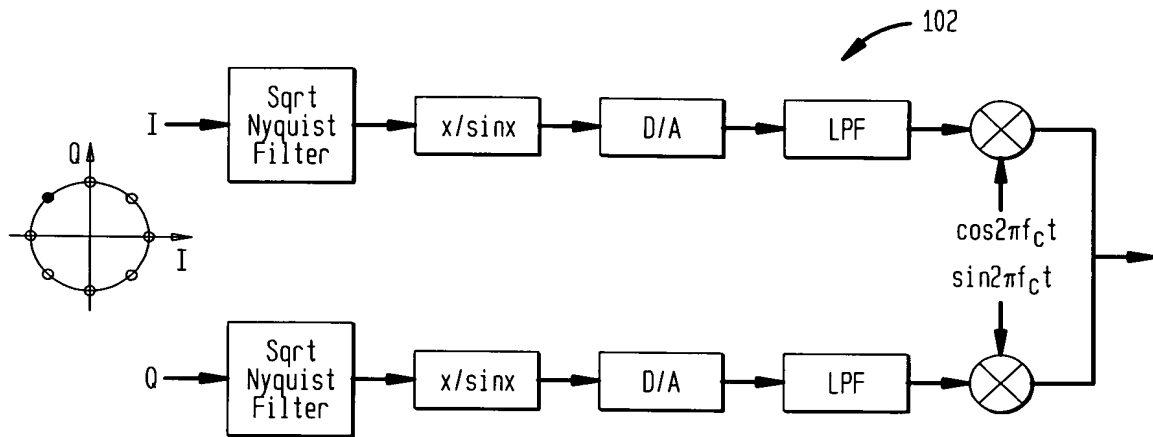
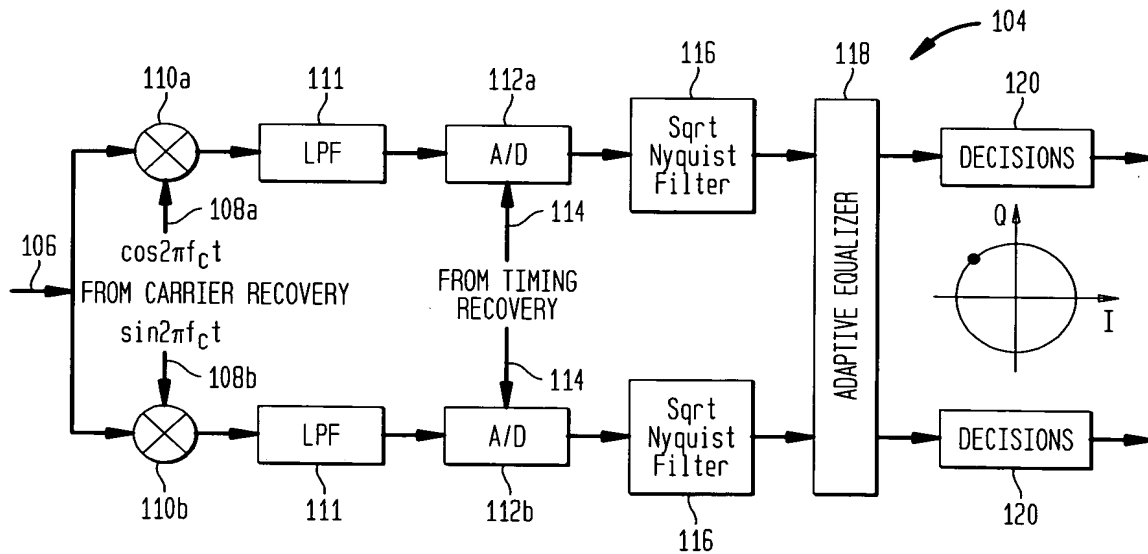


FIG. 1B
 A SIMPLIFIED PSK RECEIVER



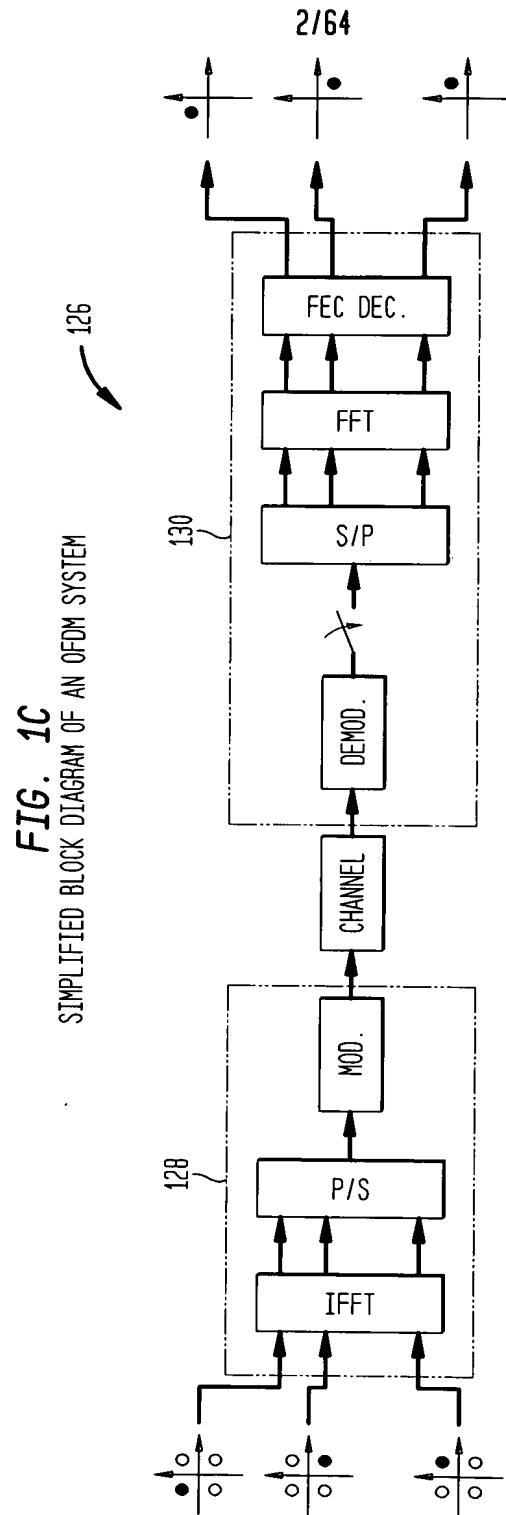
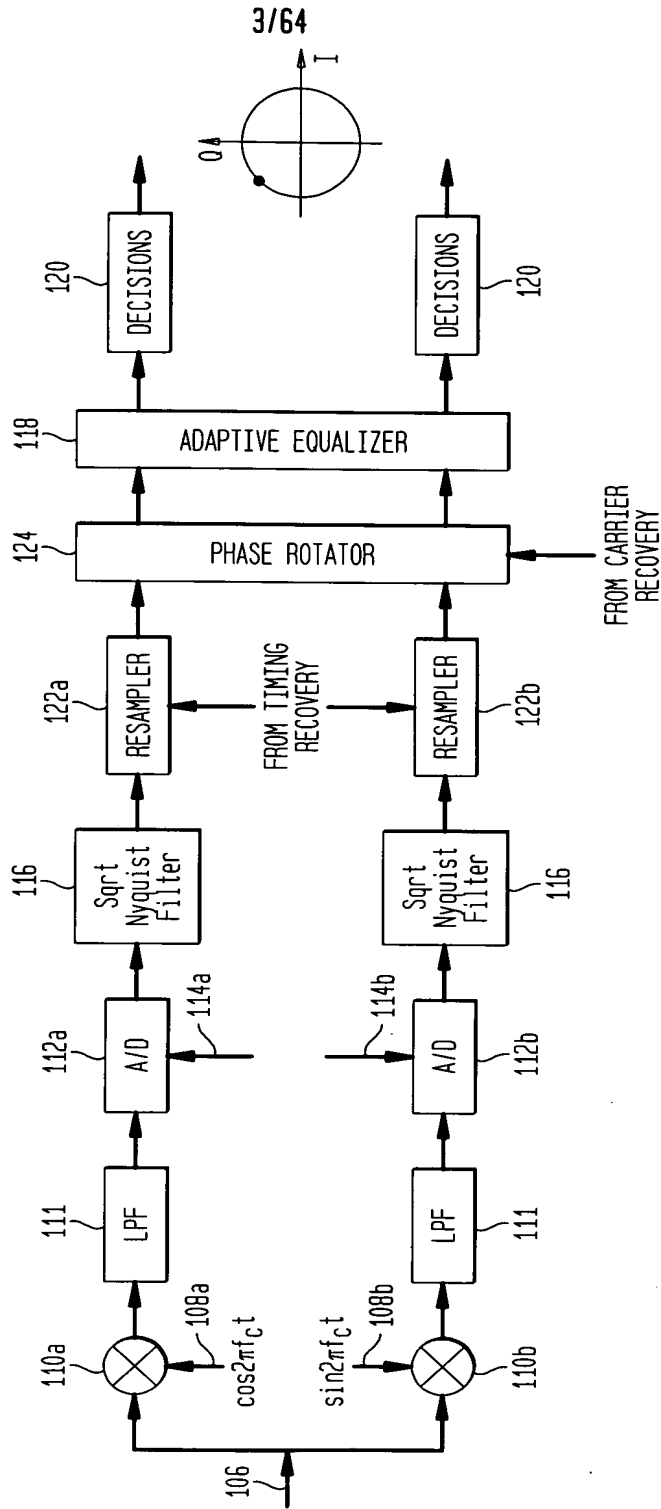


FIG. 1D
 PSK RECEIVER WITH CARRIER AND TIMING RECOVERY



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FIG. 2
 INTERPOLATION ENVIRONMENT

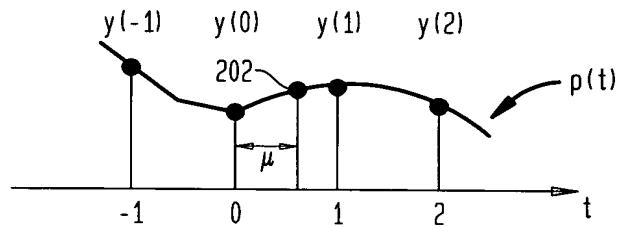
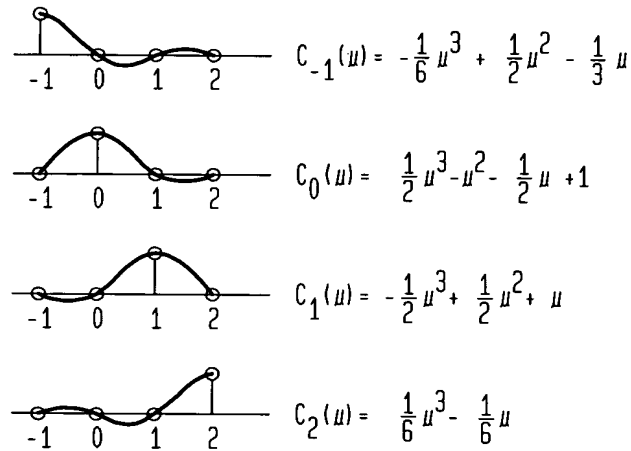
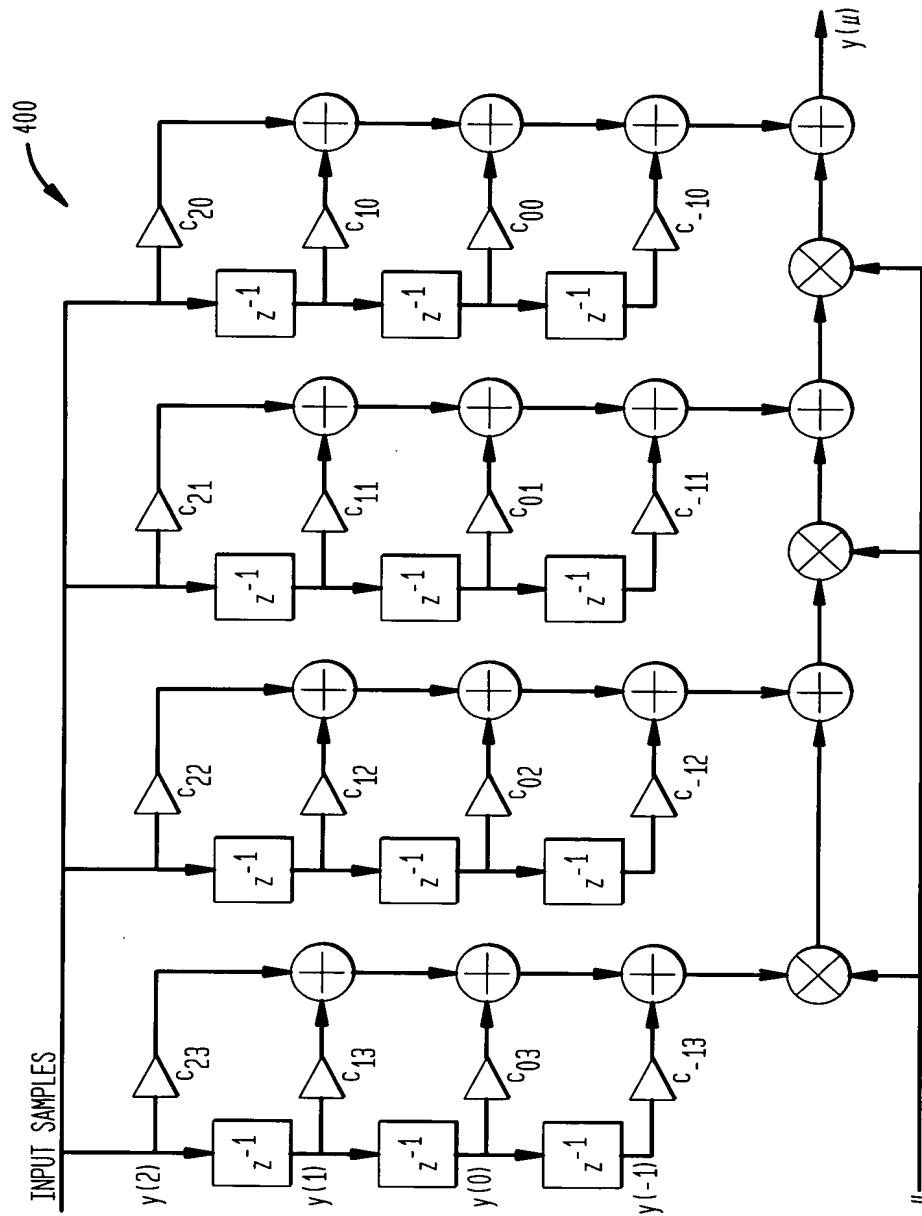


FIG. 3
 THE LAGRANGE BASIS POLYNOMIALS



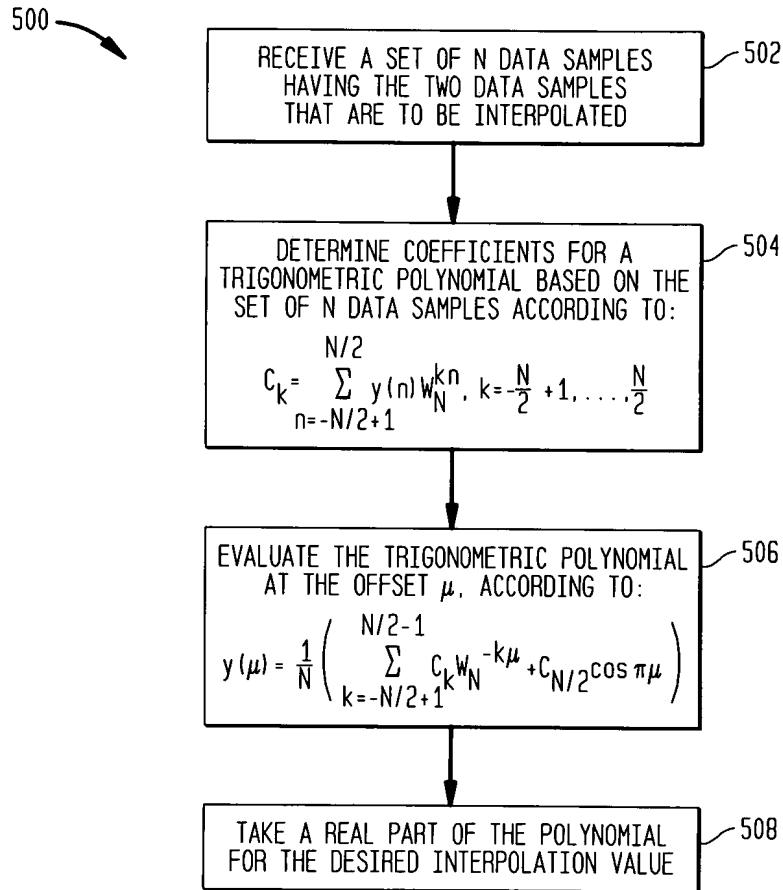
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FIG. 4
 THE FARROW STRUCTURE THAT IMPLEMENTS (2.5) AND (2.6)



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FIG. 5



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FIG. 6A
IMPULSE RESPONSES OF LAGRANGE INTERPOLATOR

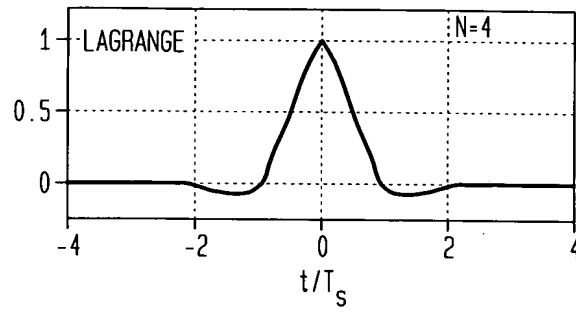


FIG. 6B
IMPULSE RESPONSES OF TRIGONOMETRIC INTERPOLATOR

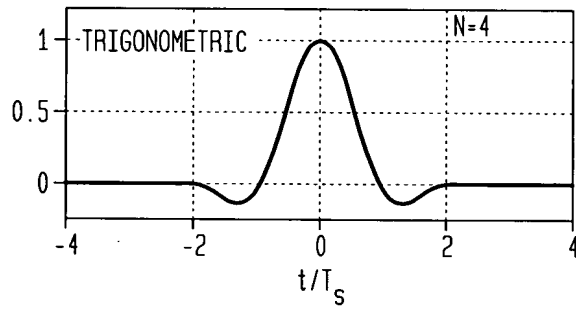
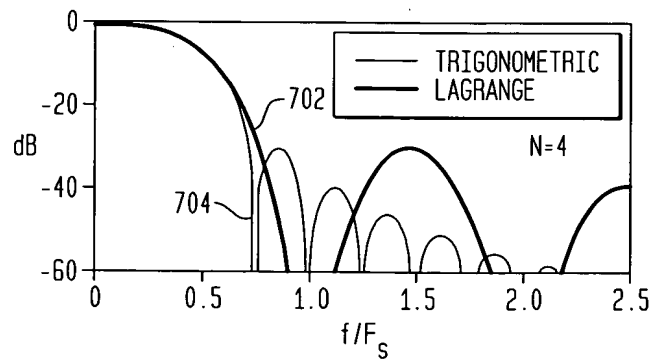


FIG. 7A
FREQUENCY RESPONSES FOR $N=4$



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FIG. 7B

FREQUENCY RESPONSES FOR N=32

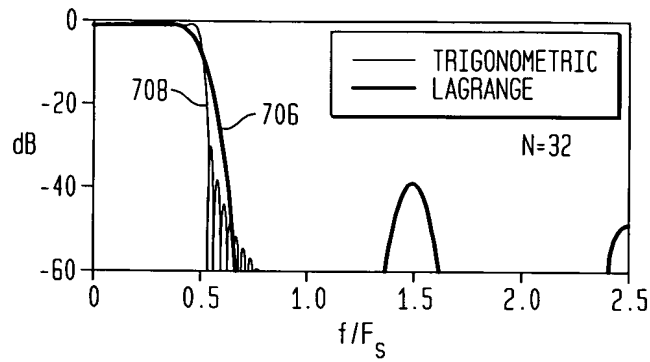


FIG. 8A

SIGNAL WITH TWO SAMPLES/SYMBOL AND 100% EXCESS BW

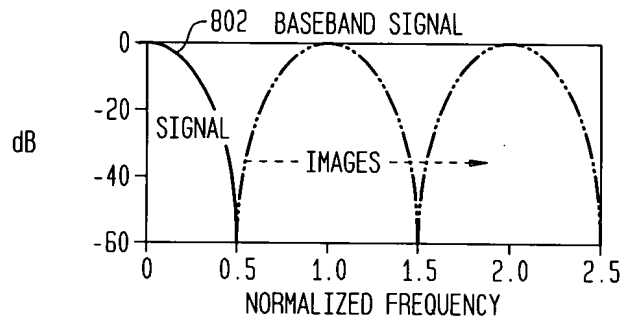
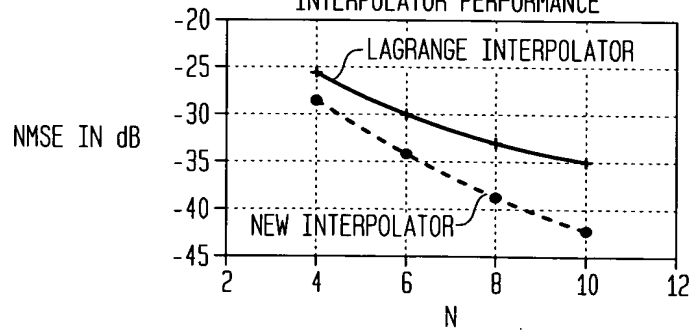


FIG. 8B

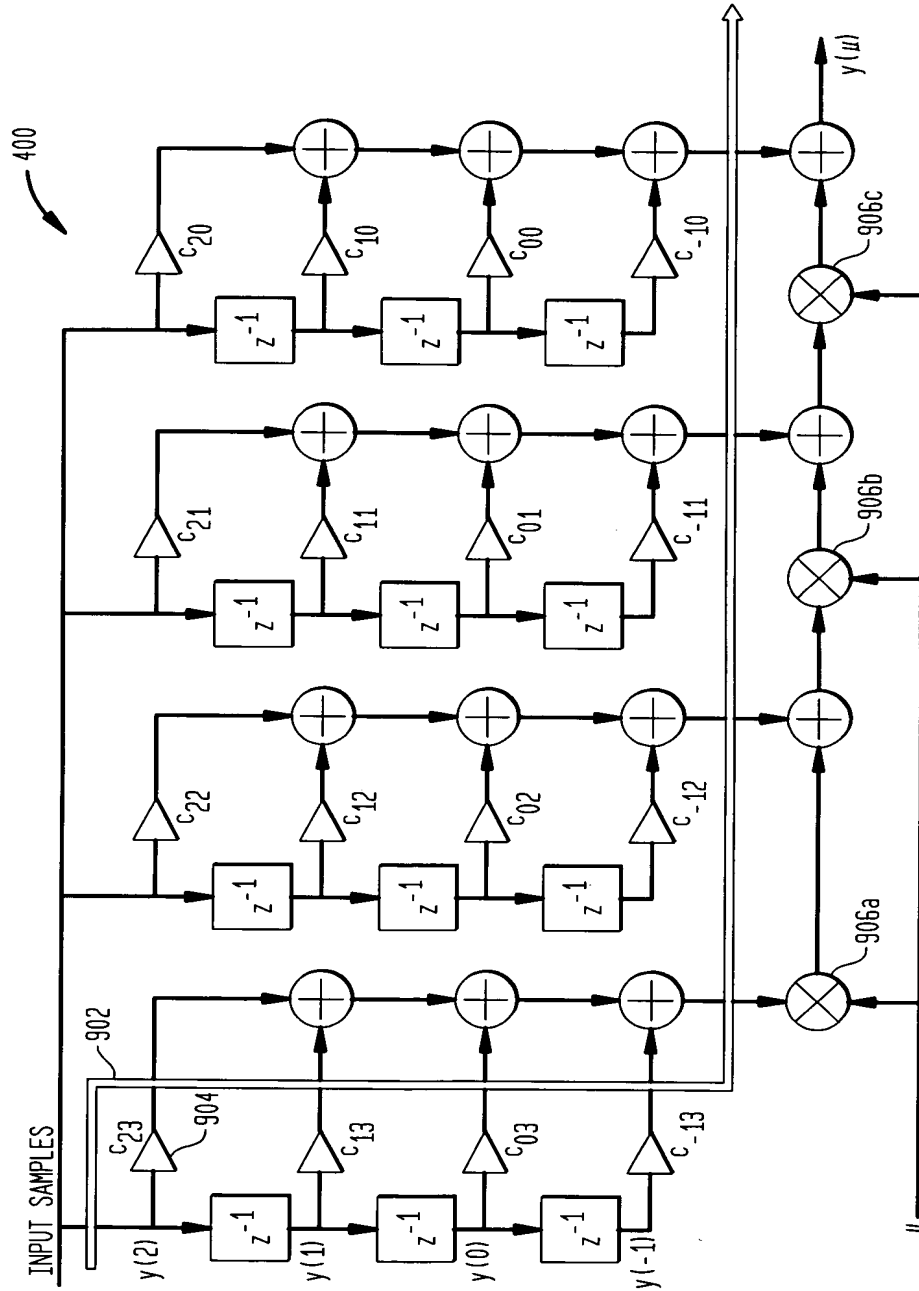
NMSE OF THE INTERPOLATED SIGNAL

INTERPOLATOR PERFORMANCE



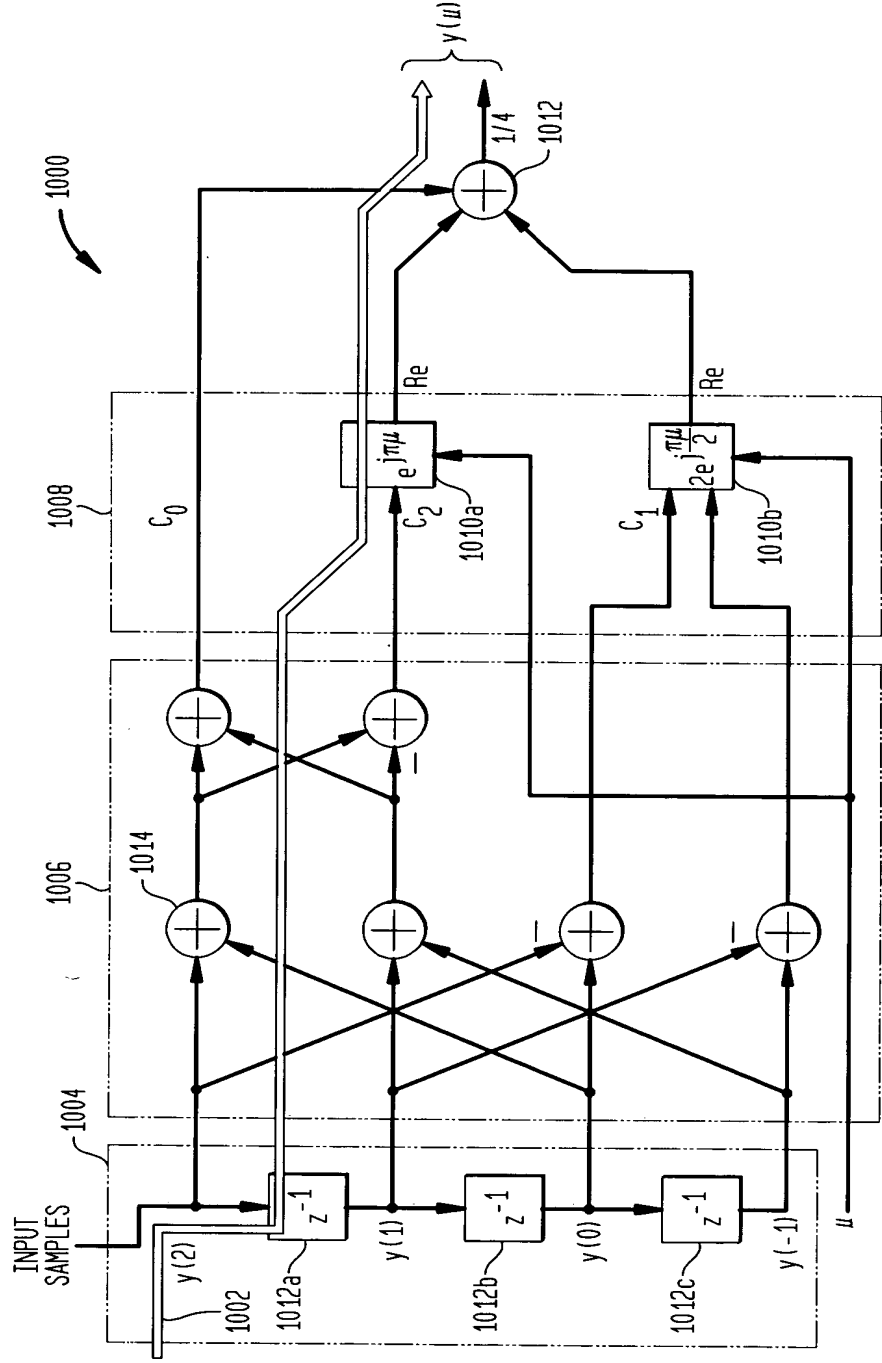
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FIG. 9
 THE CRITICAL PATH OF THE LAGRANGE CUBIC INTERPOLATOR

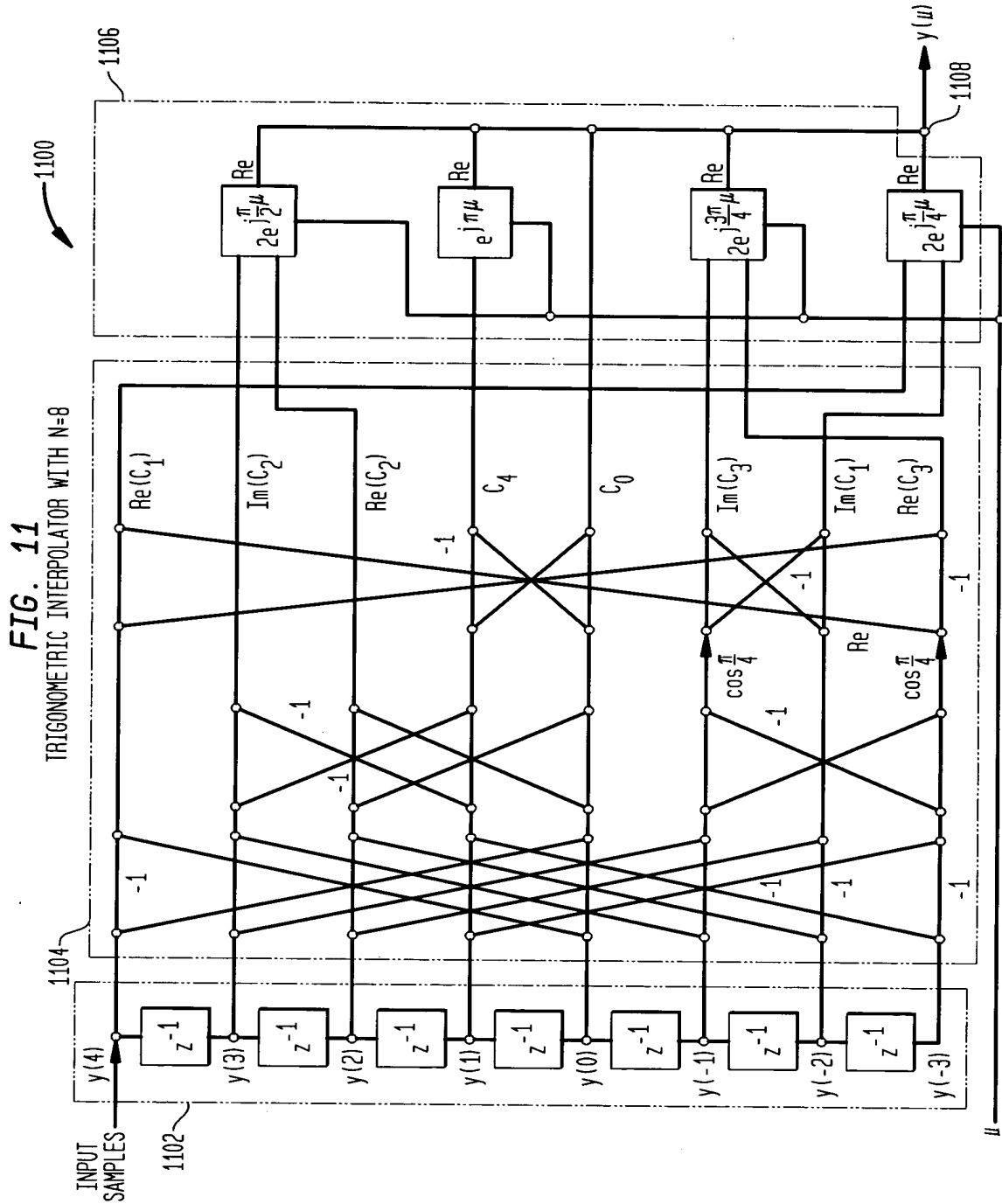


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FIG. 10
TRIGONOMETRIC INTERPOLATOR (N=4)



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FIG. 12
 CONCEPTUAL MODIFICATION OF INPUT SAMPLES

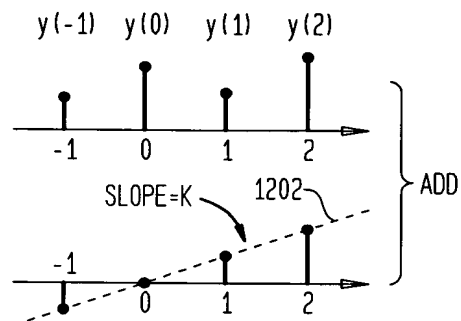
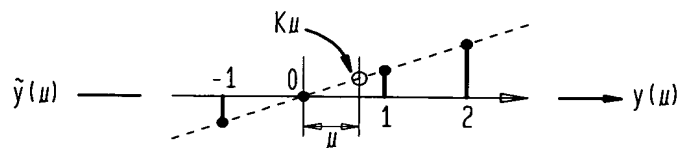
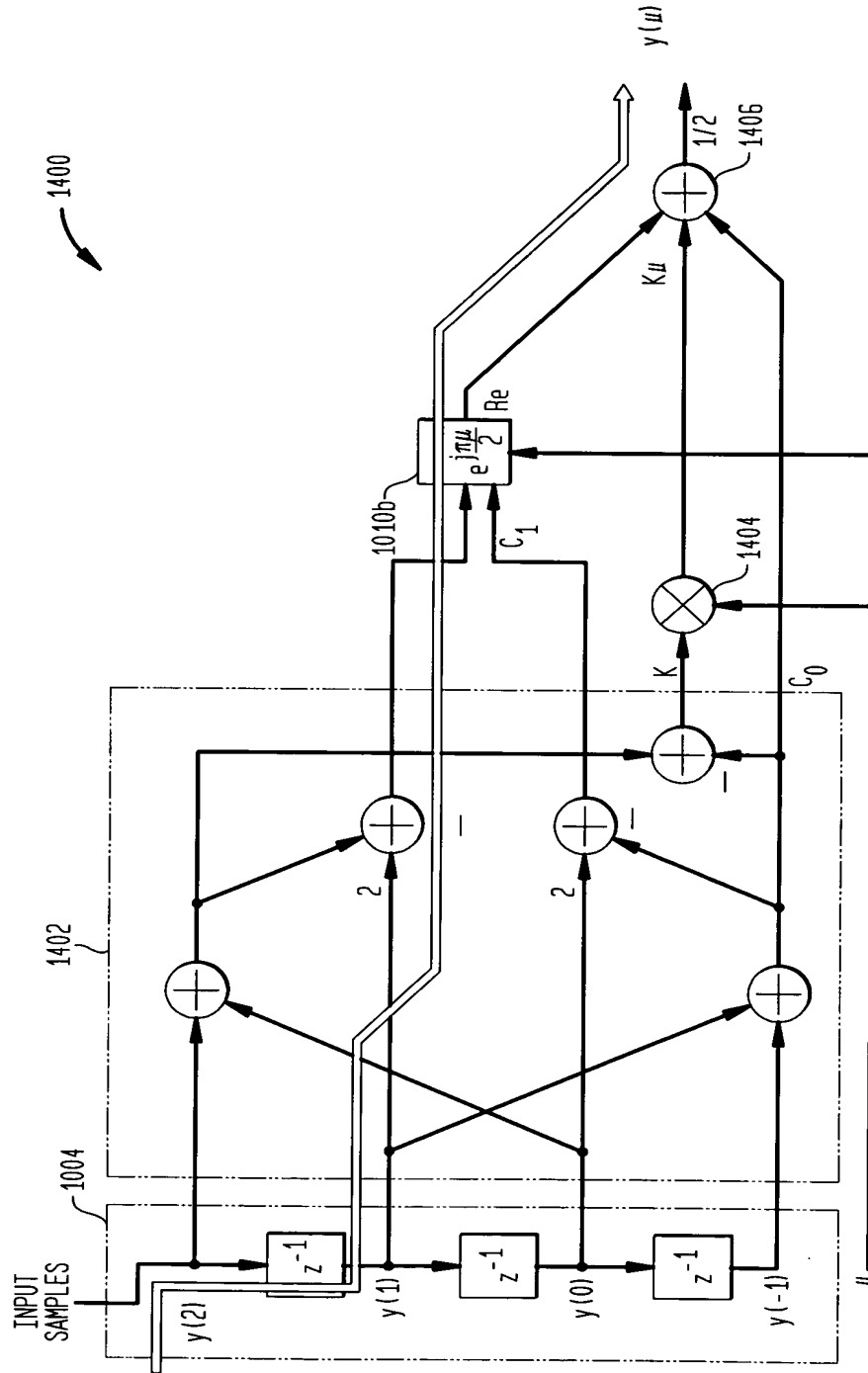


FIG. 13
 CORRECTING THE OFFSET DUE TO MODIFICATION OF ORIGINAL SAMPLES



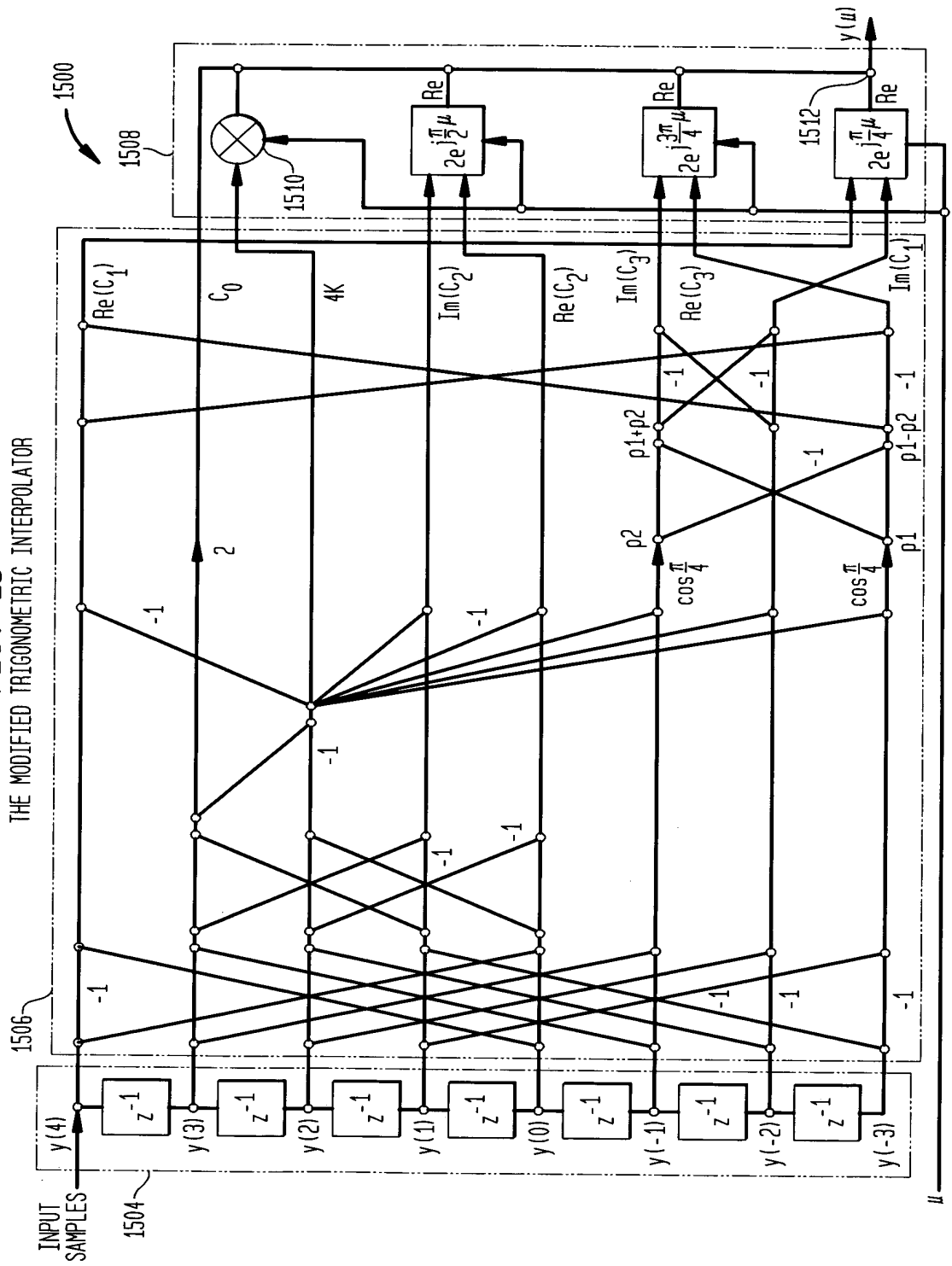
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FIG. 14
 TRIGONOMETRIC INTERPOLATOR N=4



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FIG. 15
 THE MODIFIED TRIGONOMETRIC INTERPOLATOR



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FIG. 16A
 LAGRANGE CUBIC

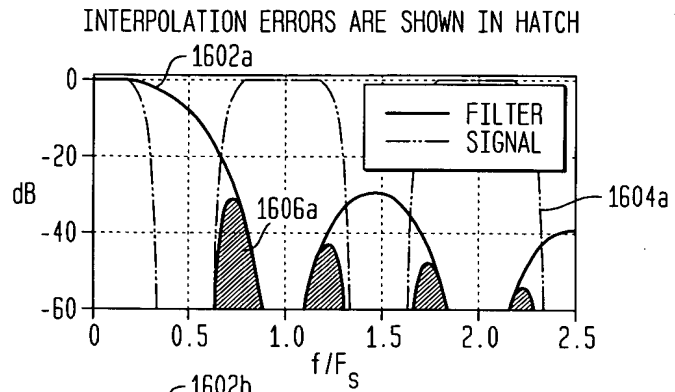


FIG. 16B
 TRIGONOMETRIC INTERPOLATOR 1000
 (FIG. 10)

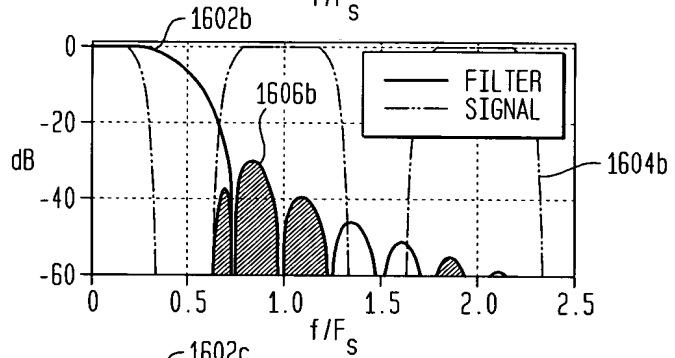


FIG. 16C
 TRIGONOMETRIC INTERPOLATOR 1400
 (FIG. 14)

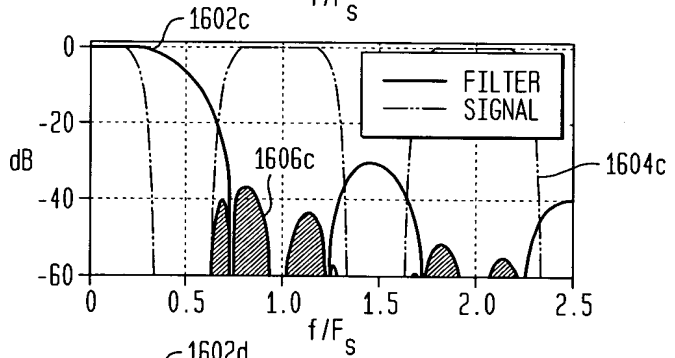
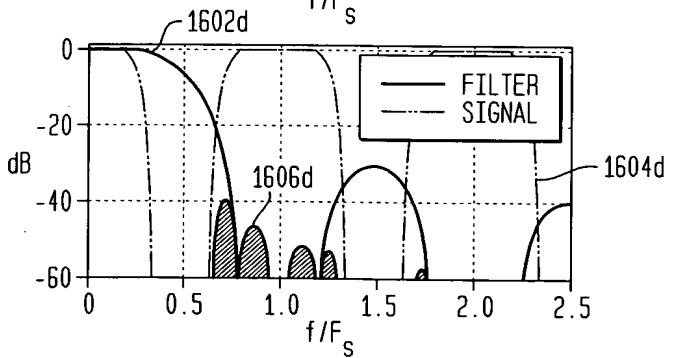



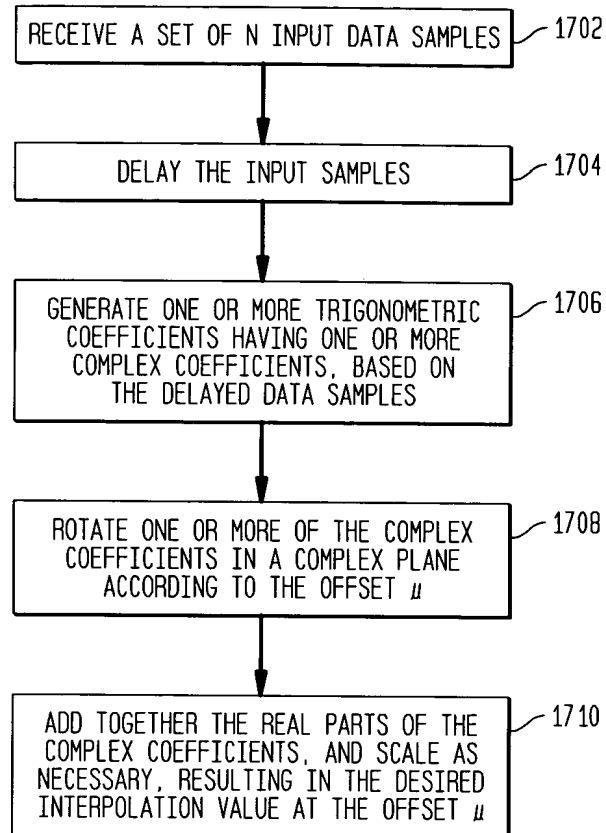
FIG. 16D
 OPTIMAL STRUCTURE



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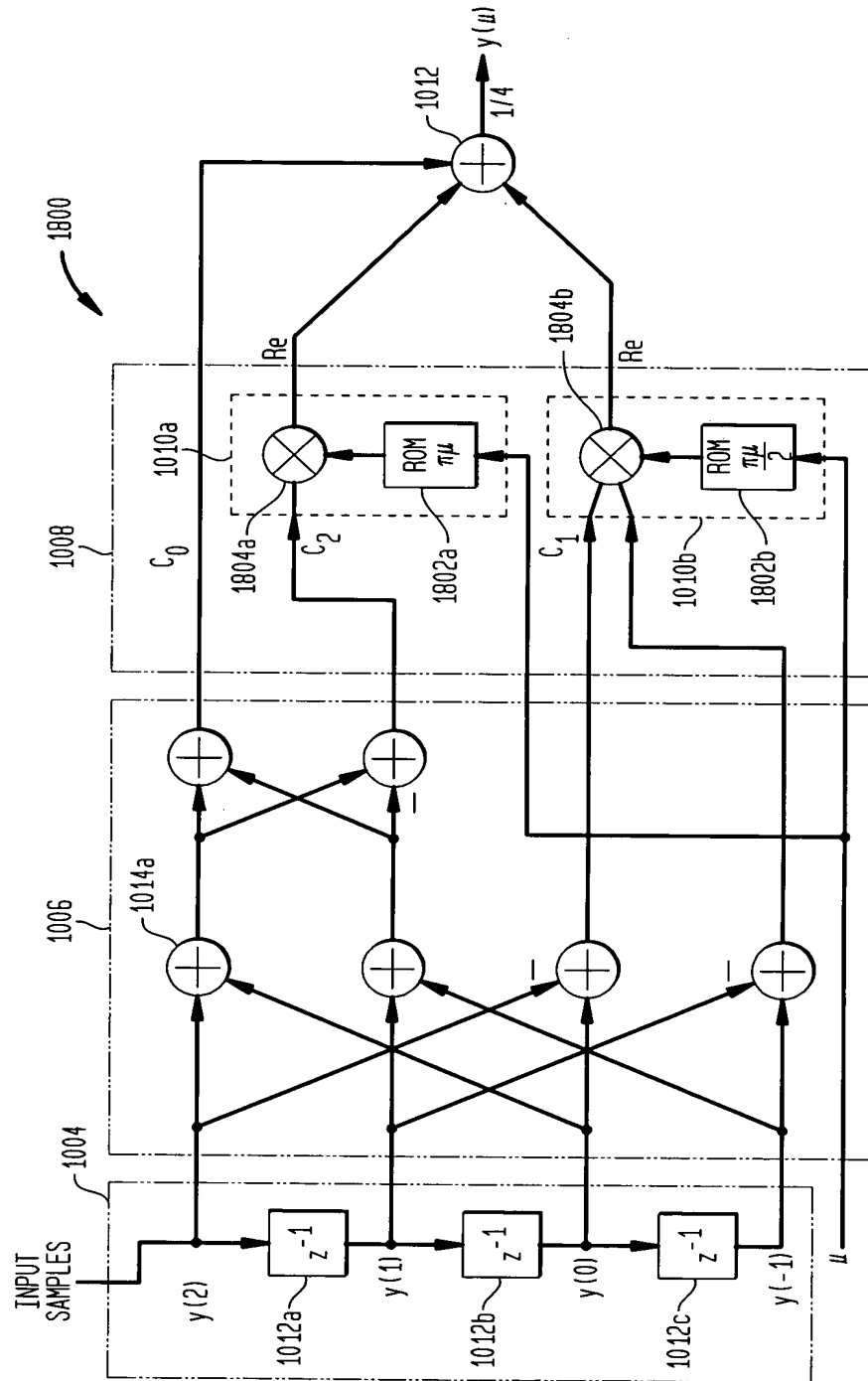
FIG. 17

1700 



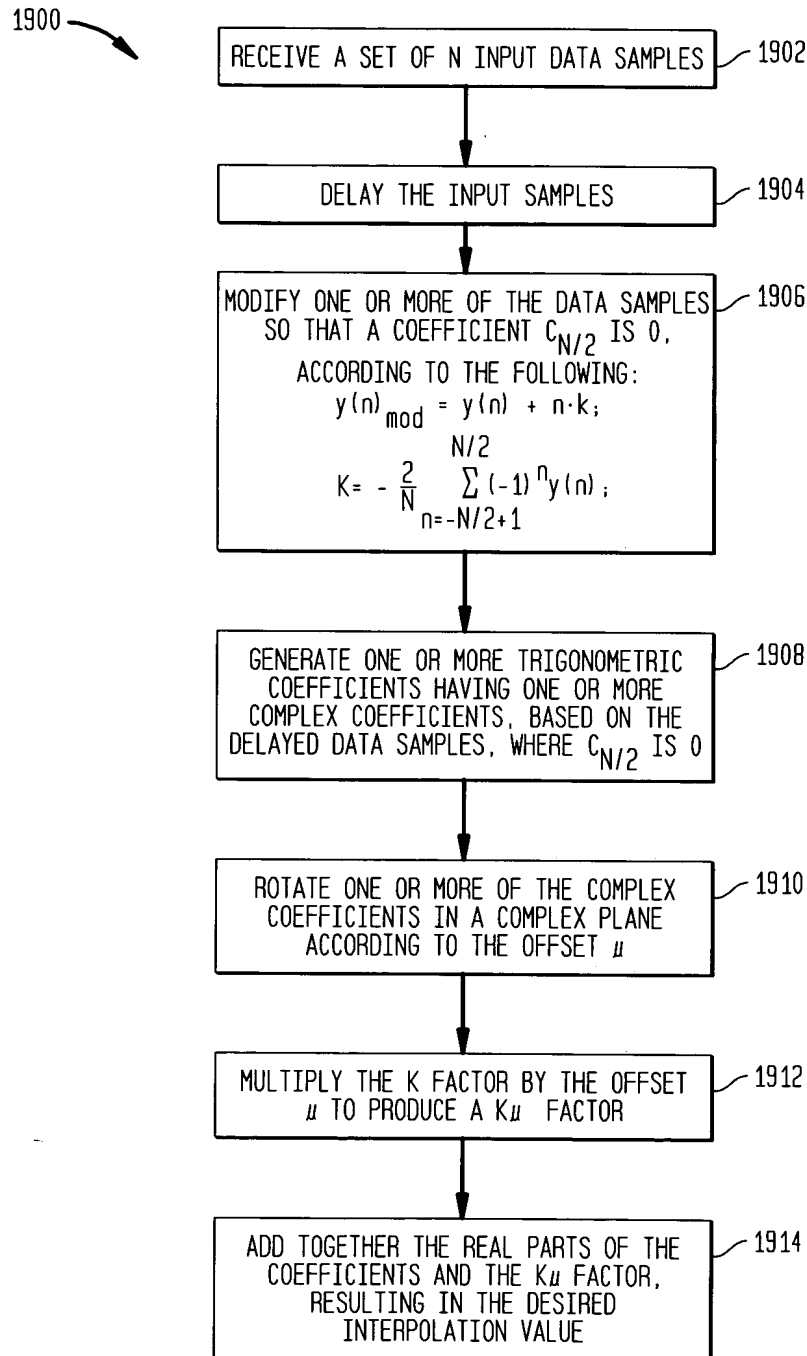
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FIG. 18



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FIG. 19



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FIG. 20A
NORMALIZED IMPULSE RESPONSES
f OF THE INTERPOLATION FILTERS

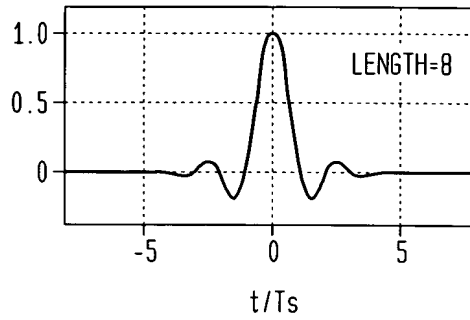


FIG. 20B
NORMALIZED IMPULSE RESPONSES
f OF THE INTERPOLATION FILTERS

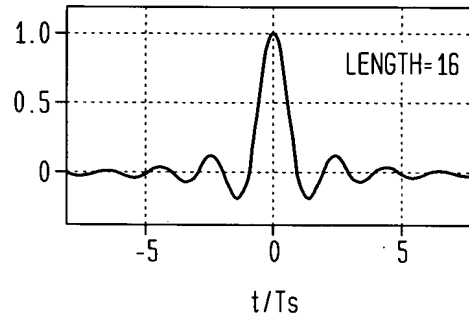


FIG. 21A
NORMALIZED FREQUENCY RESPONSES
F OF THE INTERPOLATION FILTERS

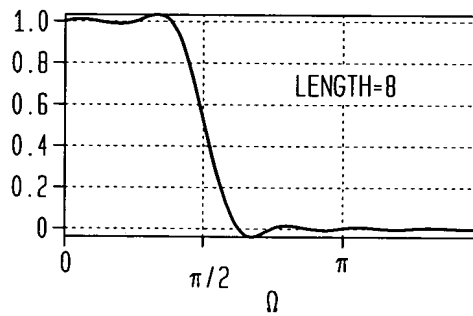
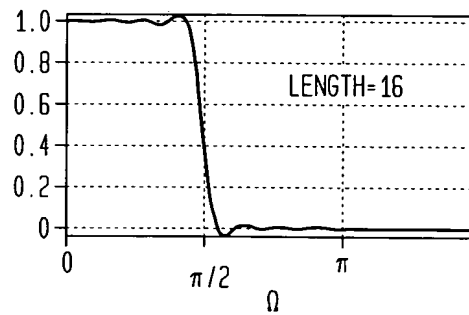
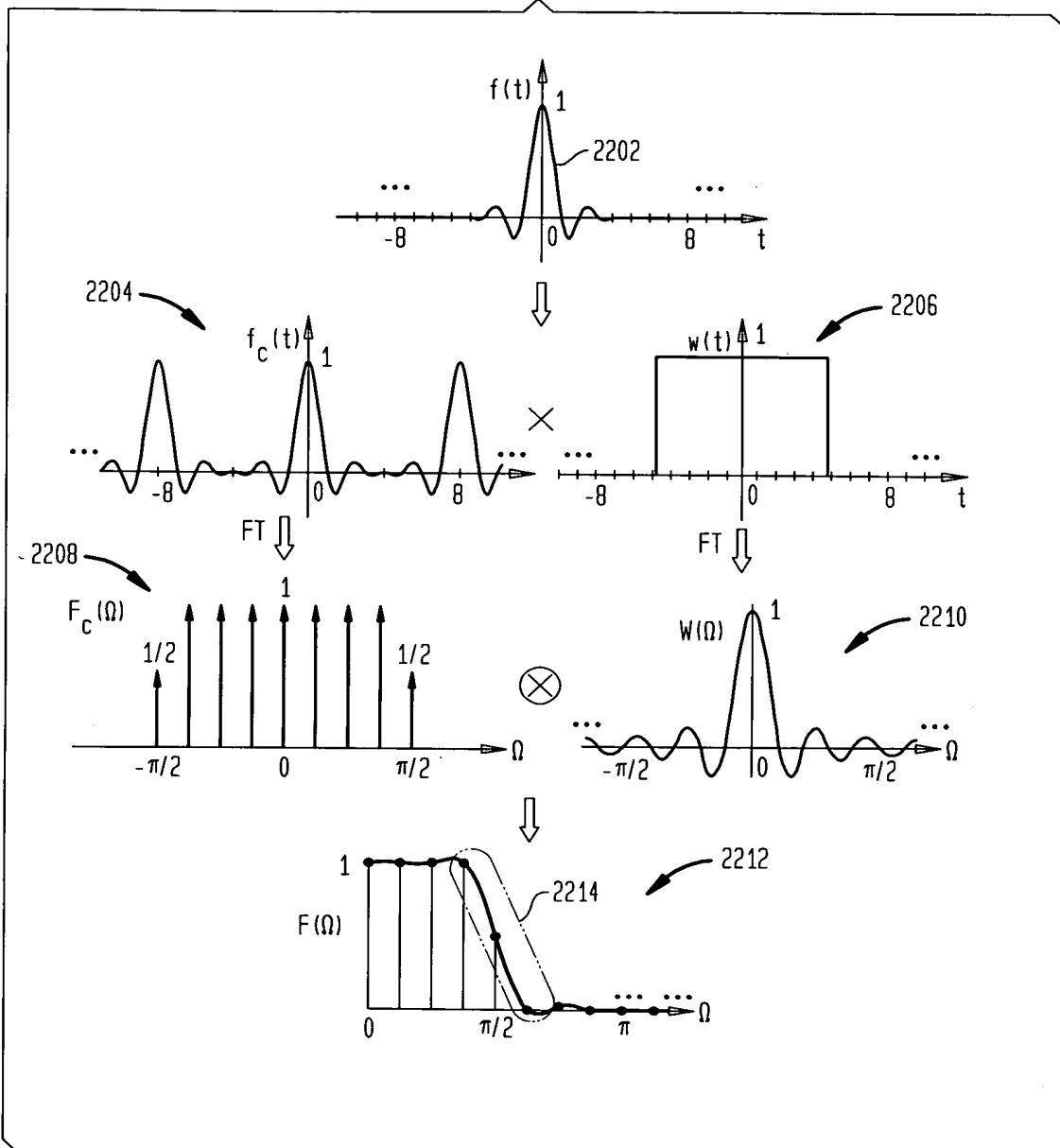


FIG. 21B
NORMALIZED FREQUENCY RESPONSES
F OF THE INTERPOLATION FILTERS



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FIG. 22
 ANALYSIS OF THE FREQUENCY RESPONSES



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FIG. 23A

EFFECT OF A MORE GRADUAL TRANSITION AT THE BAND EDGE

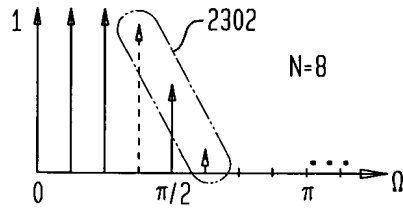


FIG. 23B

EFFECT OF A MORE GRADUAL TRANSITION AT THE BAND EDGE

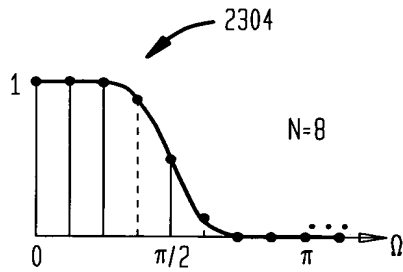
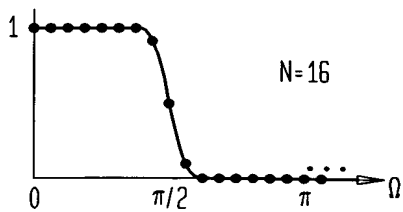


FIG. 24

REDUCING THE TRANSITION BANDWIDTH BY INCREASING N



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FIG. 25A

IMPULSE RESPONSE OF THE ORIGINAL FILTER AND THE MODIFIED FILTER

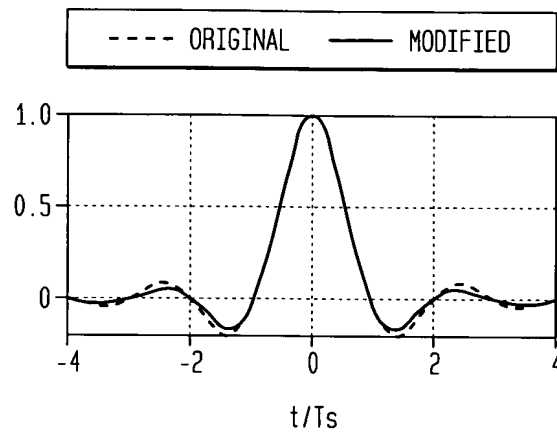
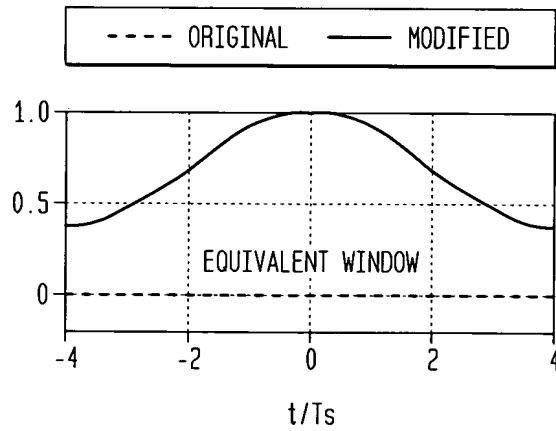


FIG. 25B

THE EQUIVALENT WINDOW



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FIG. 26

FORMING THE FREQUENCY RESPONSE OF THE
DISCRETE-TIME FRACTIONAL-DELAY FILTER

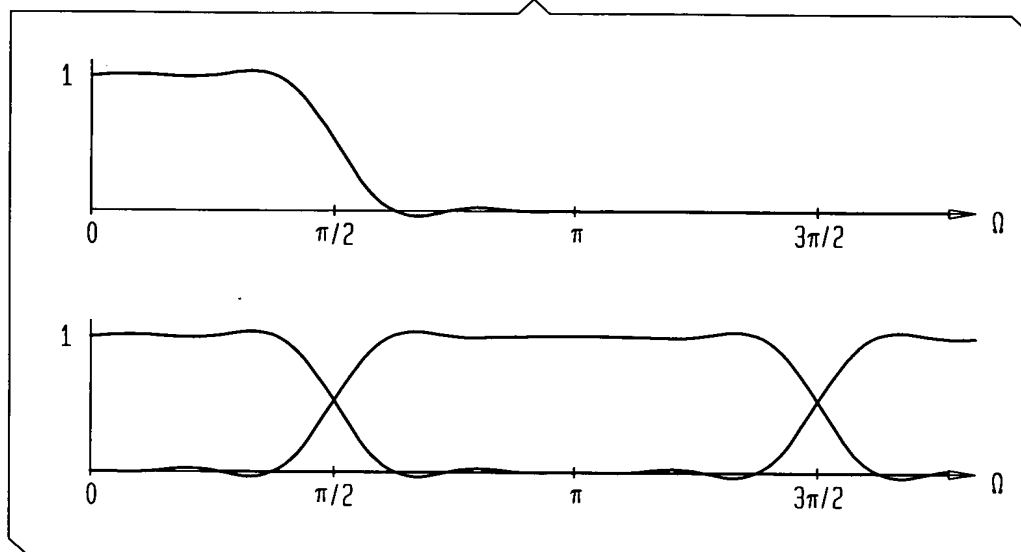


FIG. 27A

FRACTIONAL-DELAY FILTER WITH $\mu=0.12$,
USING THE PRELIMINARY N=8 INTERPOLATOR

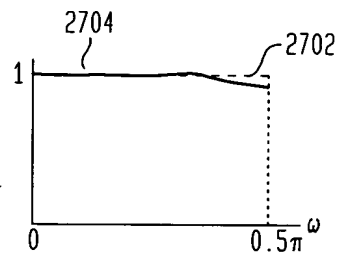
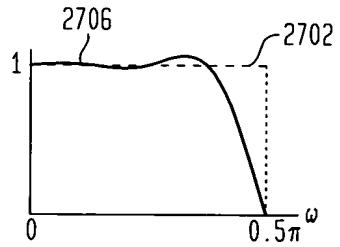


FIG. 27B

FRACTIONAL-DELAY FILTER WITH $\mu=0.5$,
USING THE PRELIMINARY N=8 INTERPOLATOR



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FIG. 28A

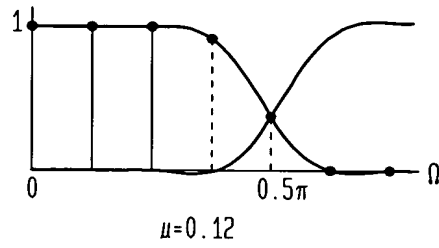


FIG. 28B

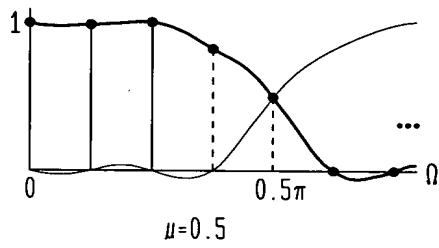


FIG. 28C

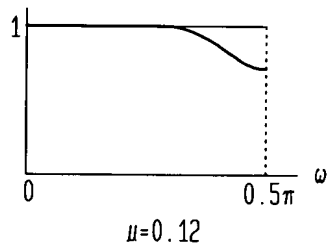
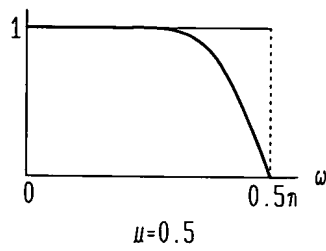


FIG. 28D



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FIG. 29A

$F_{\mu}(\omega)$, WITH $\mu=0.5$, $N=8$, BEFORE OPTIMIZATION

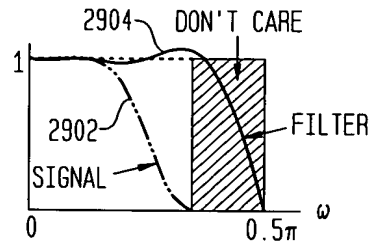


FIG. 29B

$F_{\mu}(\omega)$, WITH $\mu=0.5$, $N=8$, AFTER OPTIMIZATION

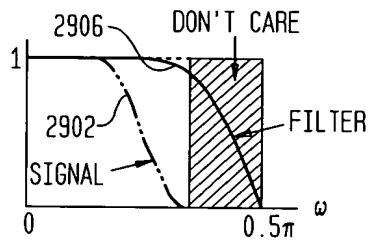


FIG. 30A

$F_{\mu}(\omega)$, WITH $\mu=0.5$, $N=4$, BEFORE MODIFICATION

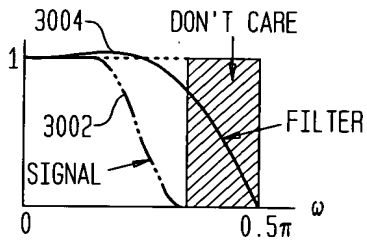
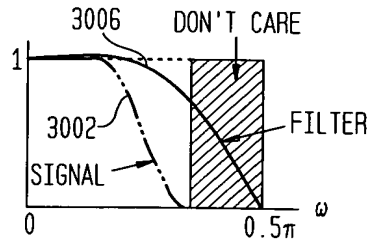


FIG. 30B

$F_{\mu}(\omega)$, WITH $\mu=0.5$, $N=4$, AFTER MODIFICATION



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FIG. 31A

$F_{\mu}(\omega)$, $\mu=0.5$, SIMPLIFIED N=4 STRUCTURE BEFORE MODIFICATION

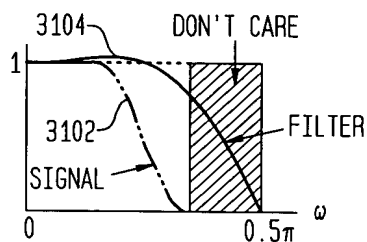


FIG. 31B

$F_{\mu}(\omega)$, $\mu=0.5$, SIMPLIFIED N=4 STRUCTURE AFTER MODIFICATION

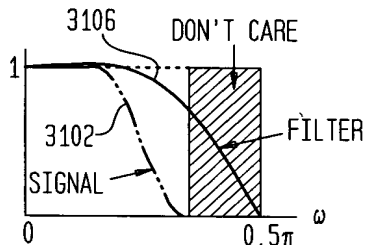


FIG. 32

REAL AND IMAGINARY COMPONENTS OF THE $F_{\mu}(1)e^{j\frac{\pi}{2}\mu}$ VALUE

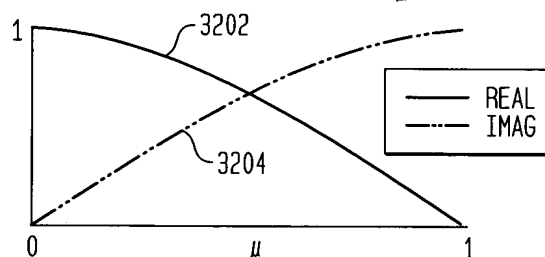
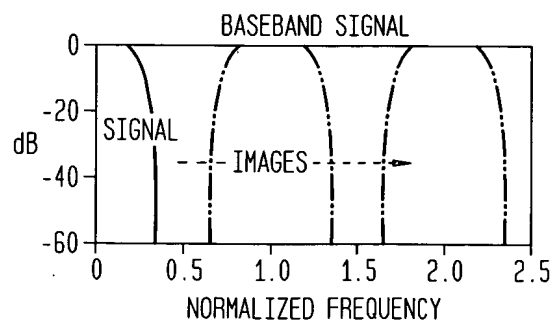


FIG. 33

SIGNAL WITH TWO SAMPLES/SYMBOL AND 40% EXCESS BANDWIDTH



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FIG. 34

3400

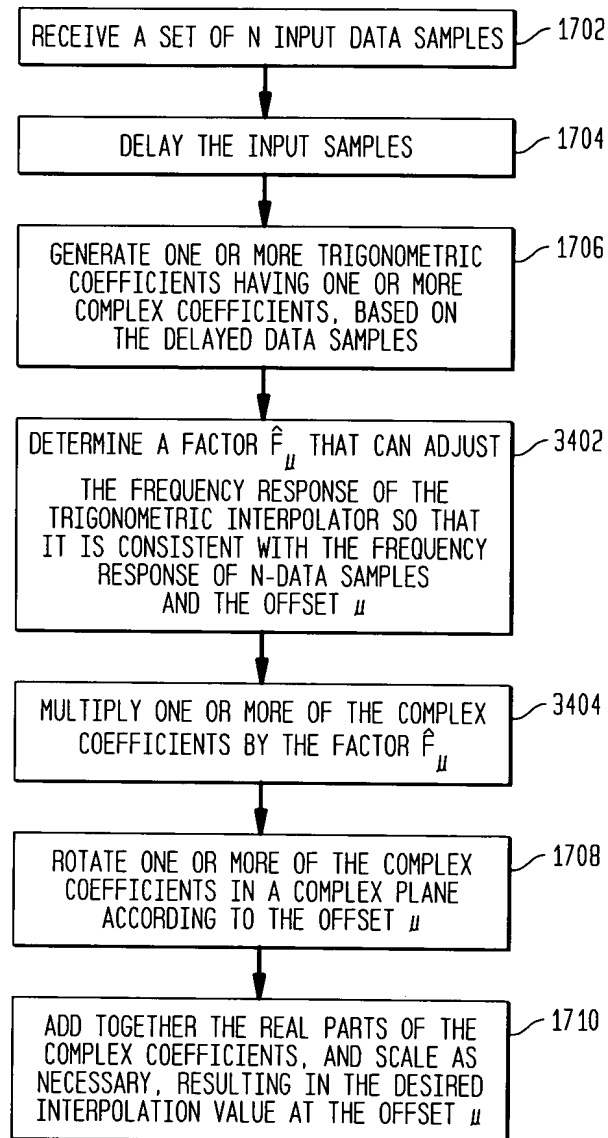
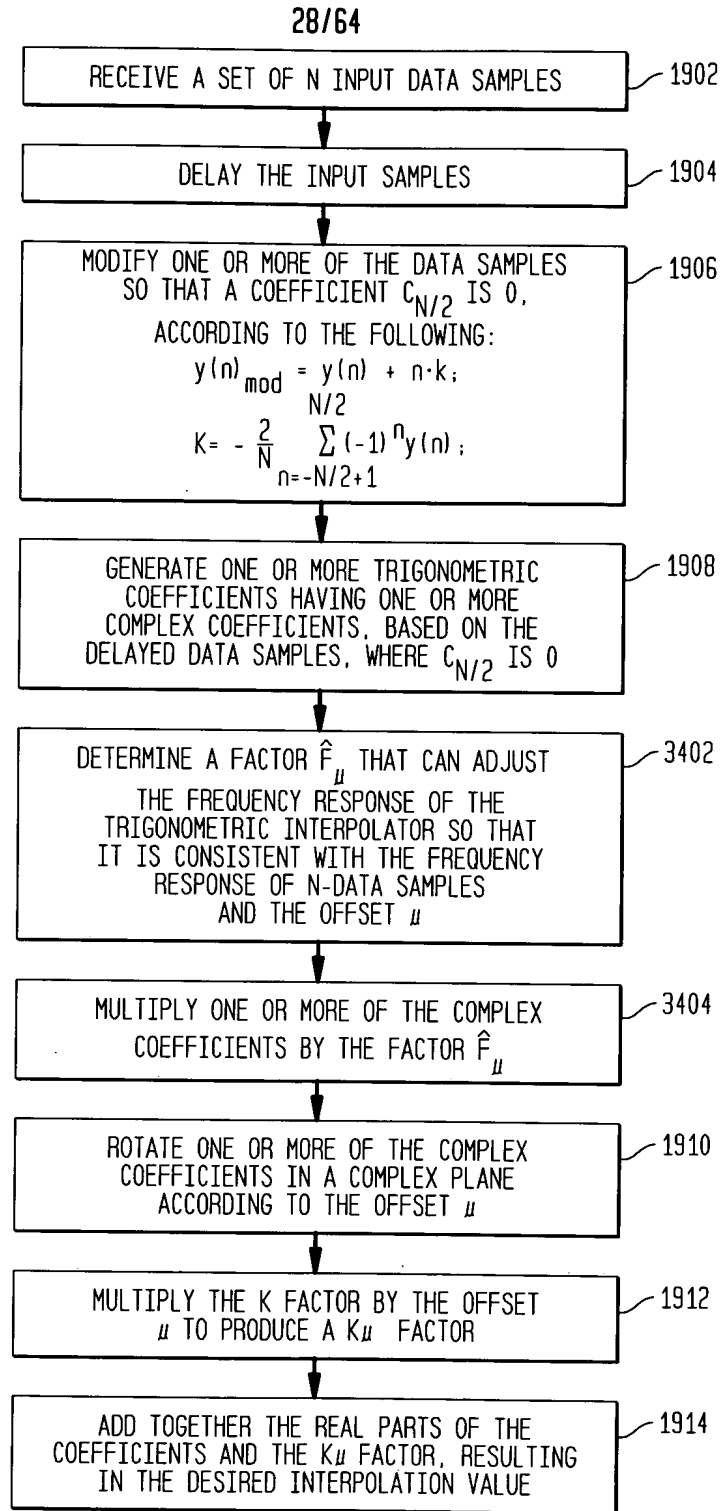


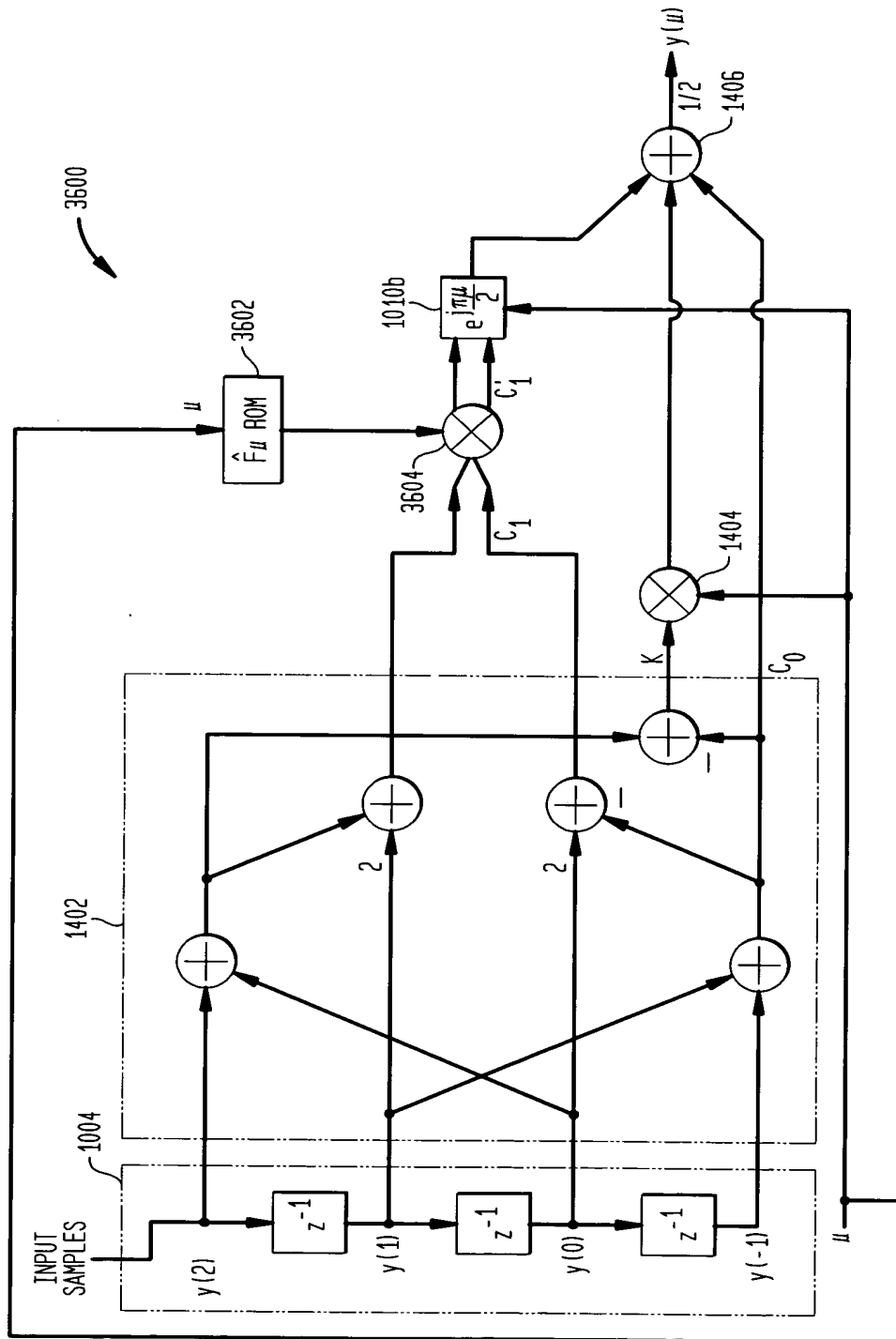
FIG. 35

3500



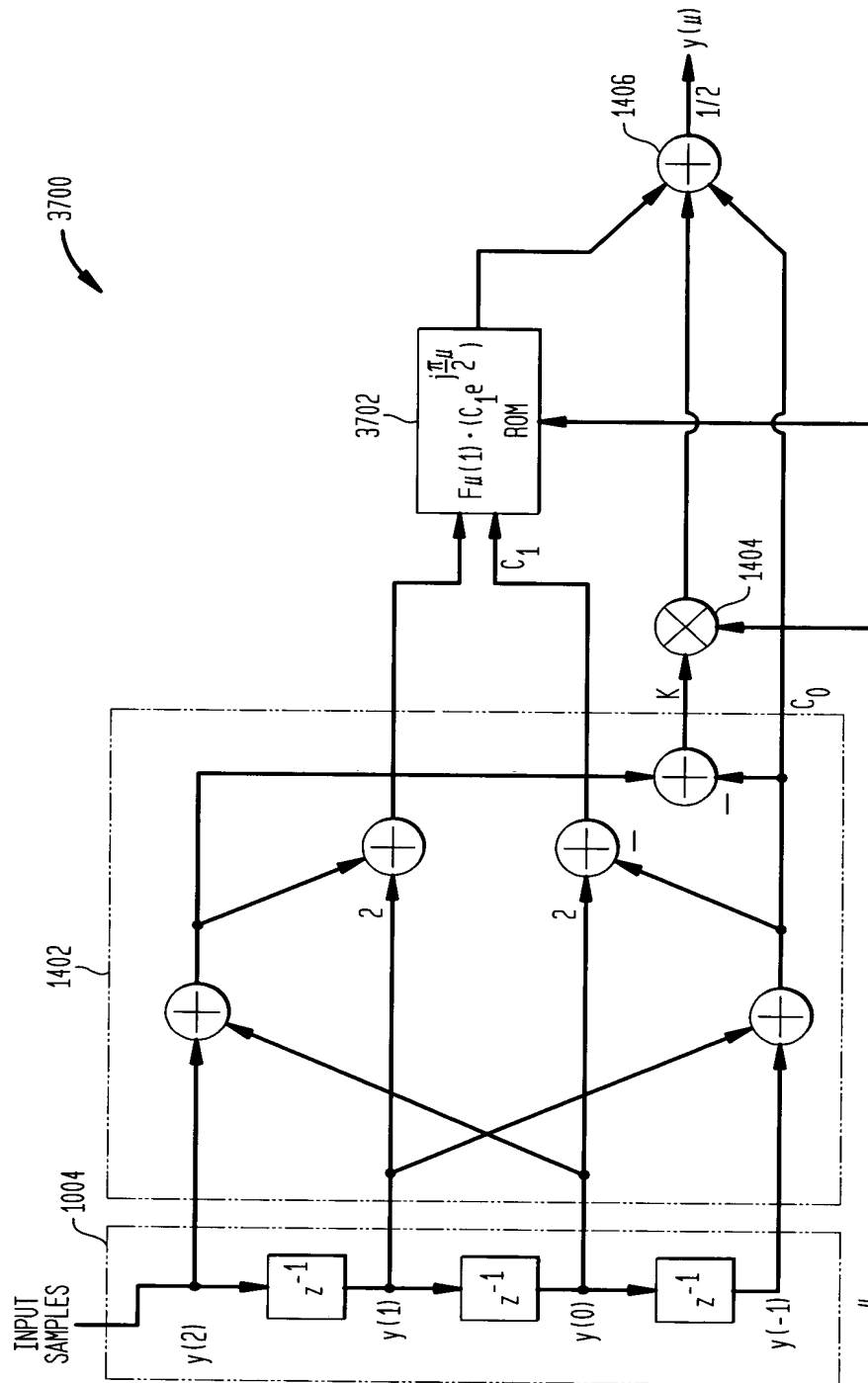
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FIG. 36
 THE OPTIMIZED STRUCTURE FOR N=4

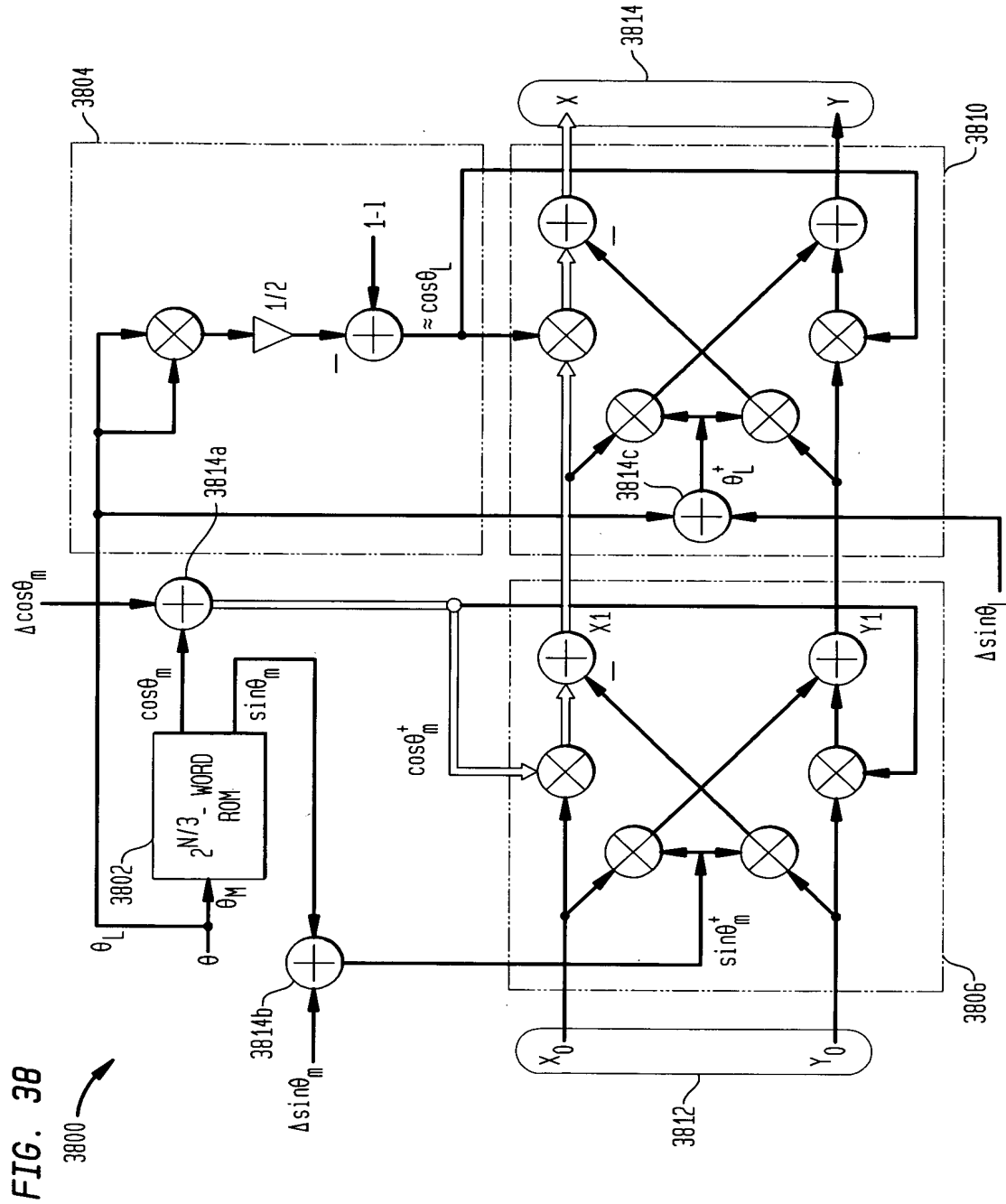


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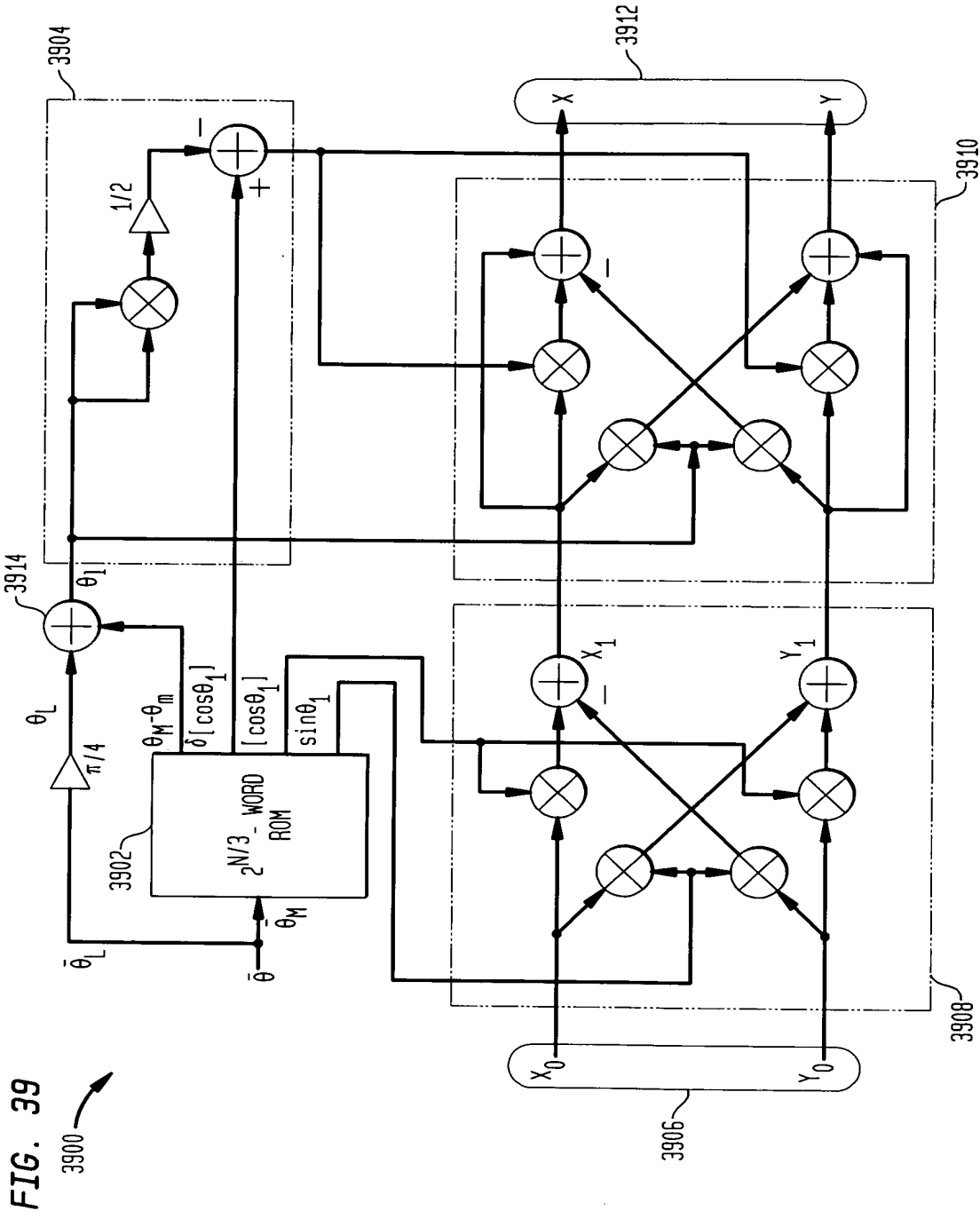
FIG. 37
 THE OPTIMIZED STRUCTURE FOR N=4



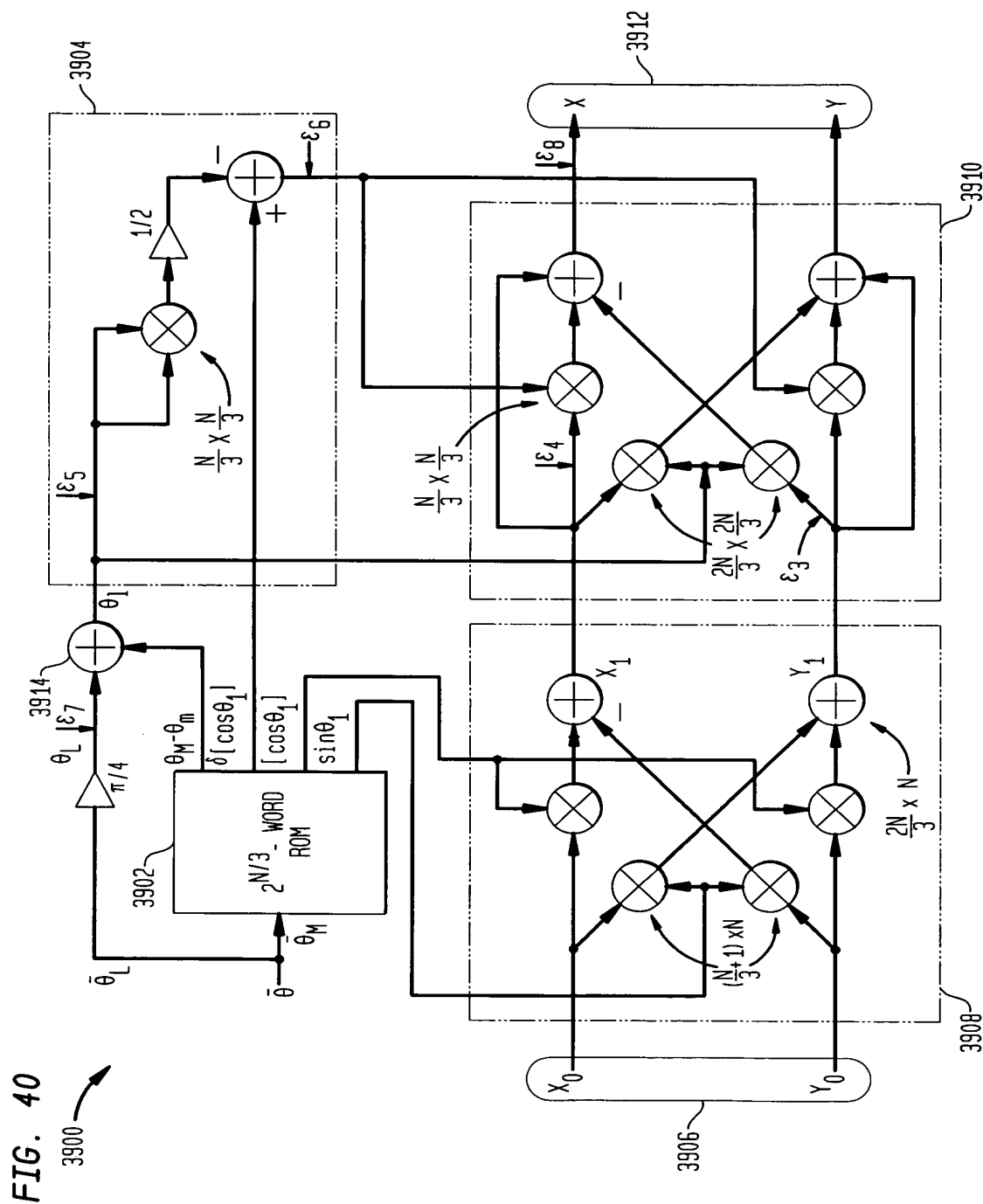
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FIG. 41

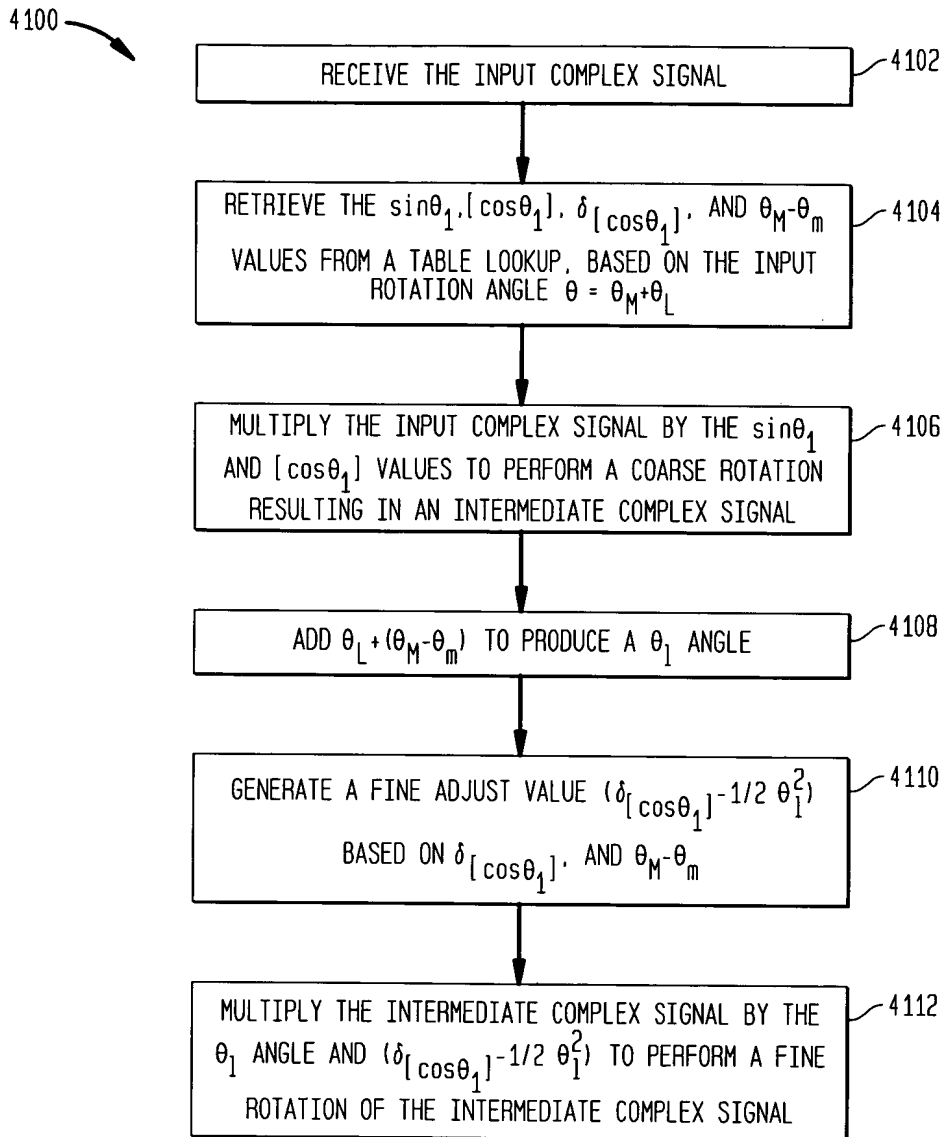
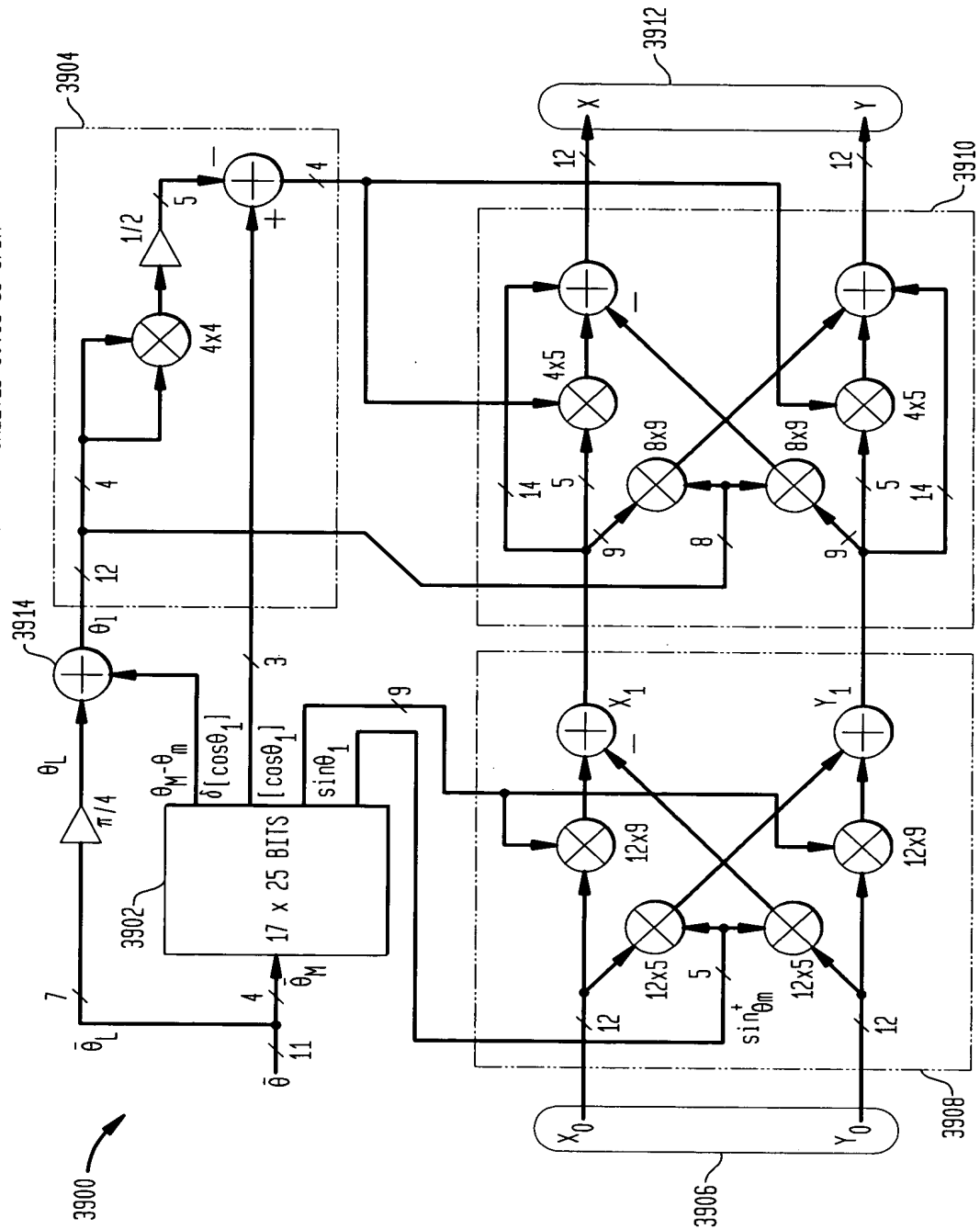
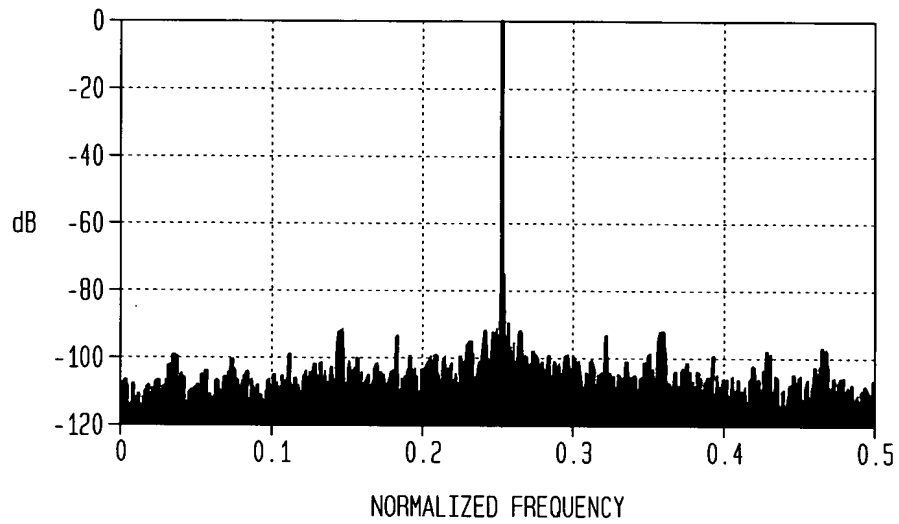


FIG. 42
THE INTERNAL WORDLENGTH OF THE STRUCTURE THAT ACHIEVED 90.36 db SFDR



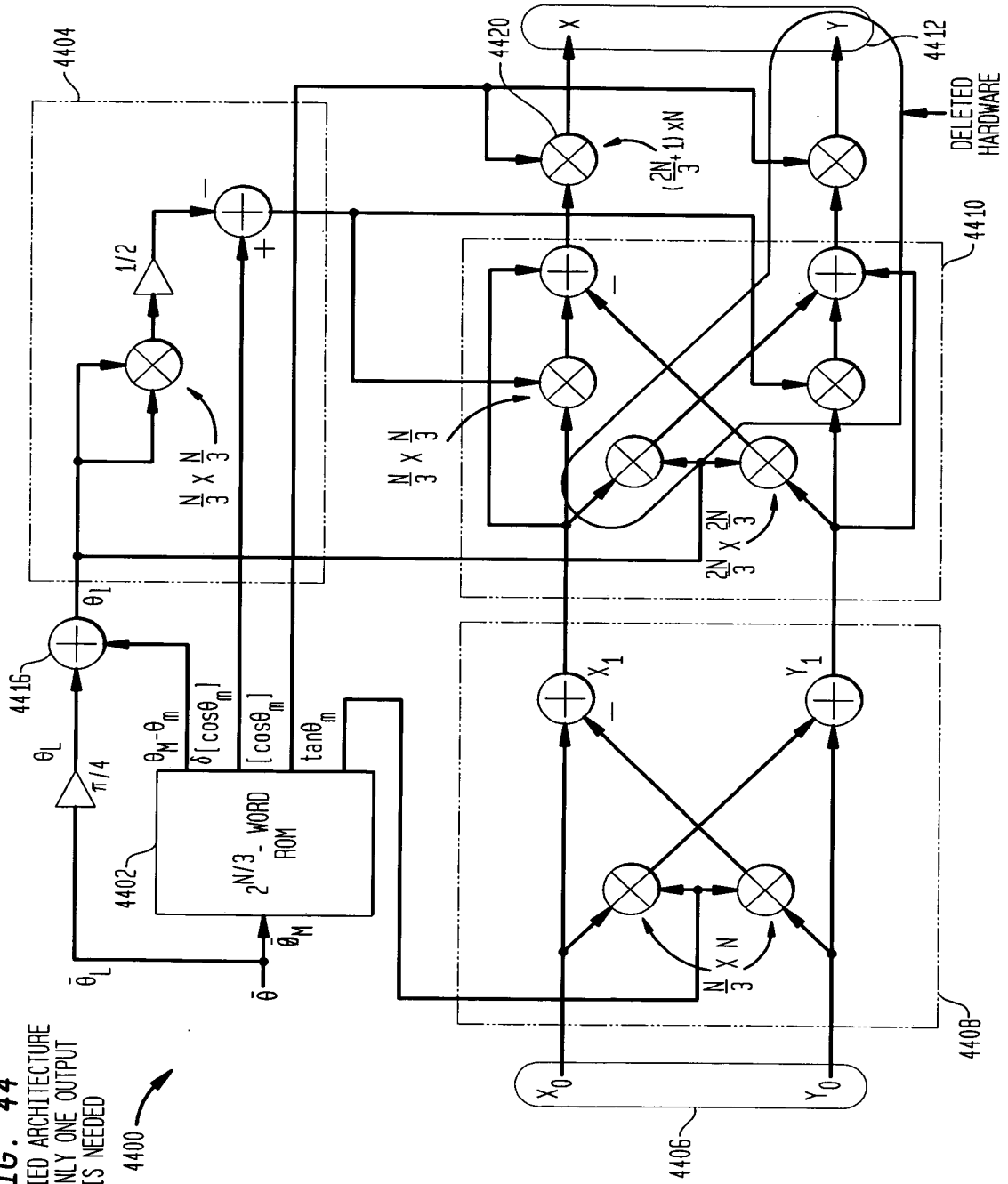
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FIG. 43
OUTPUT SPECTRUM SHOWING 90.36 dB SFDR



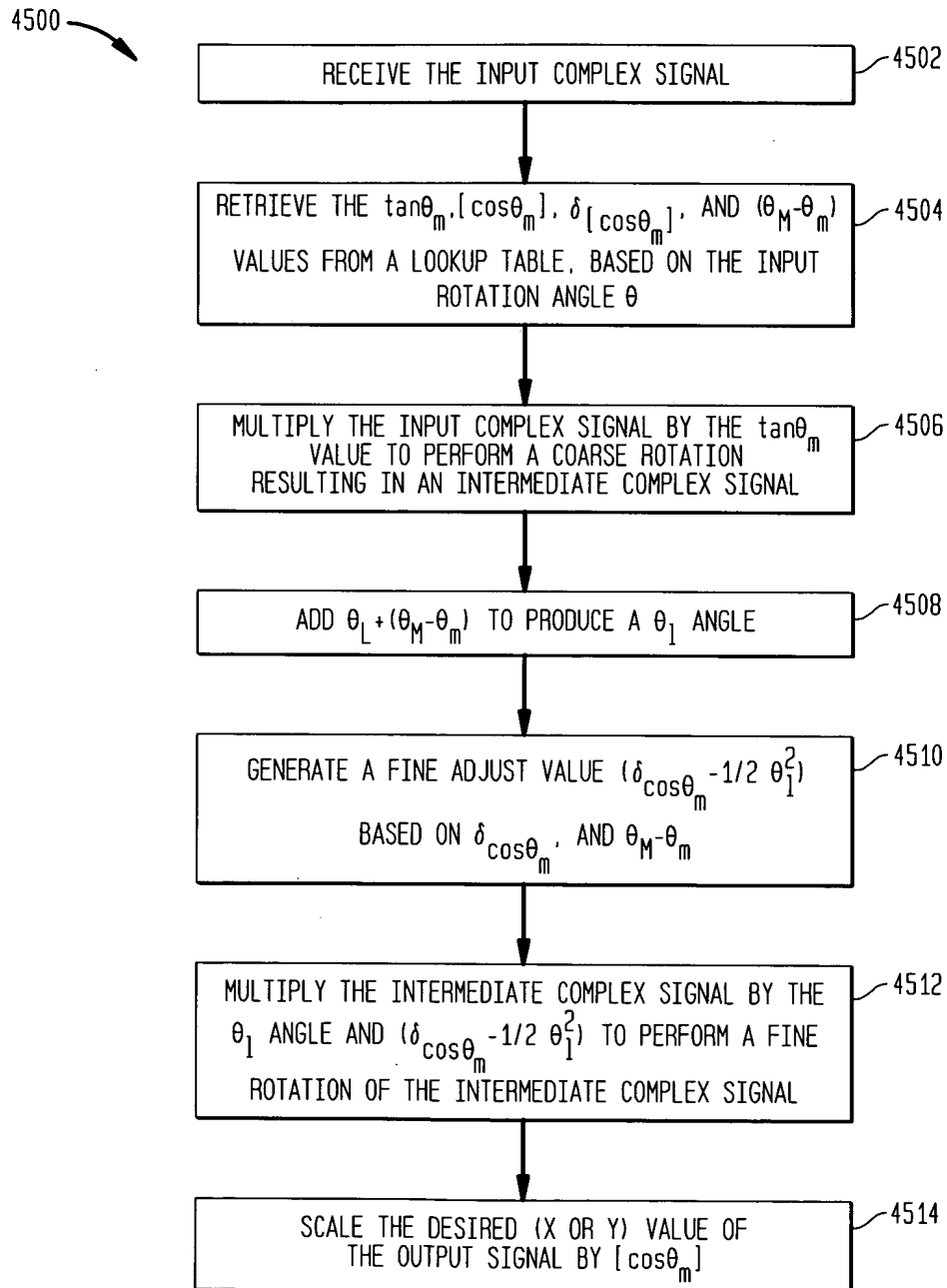
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FIG. 44
 A MODIFIED ARCHITECTURE
 WHEN ONLY ONE OUTPUT
 IS NEEDED



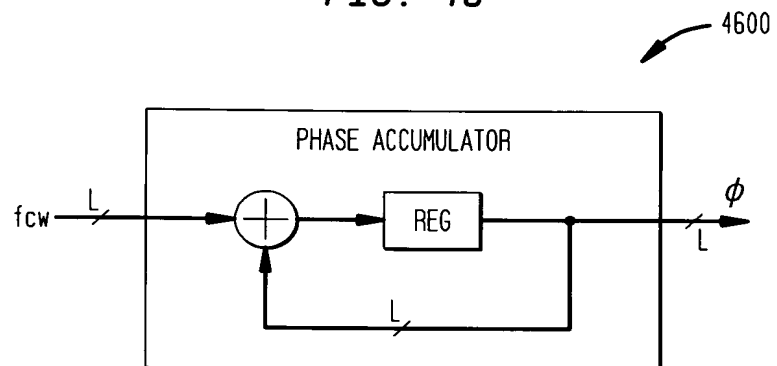
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FIG. 45



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FIG. 46



WHERE THE ADDER IS AN OVERFLOWING ACCUMULATOR

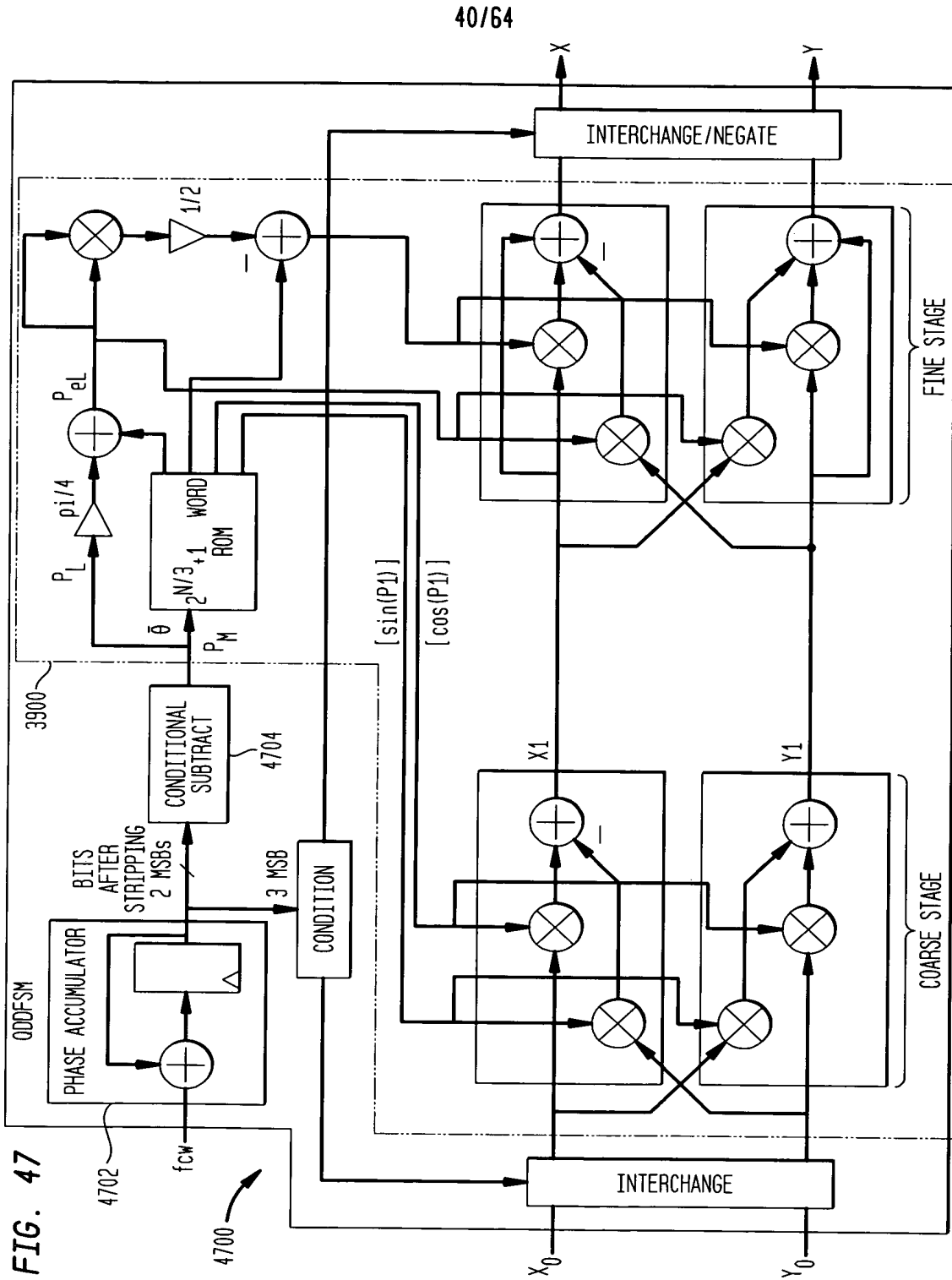
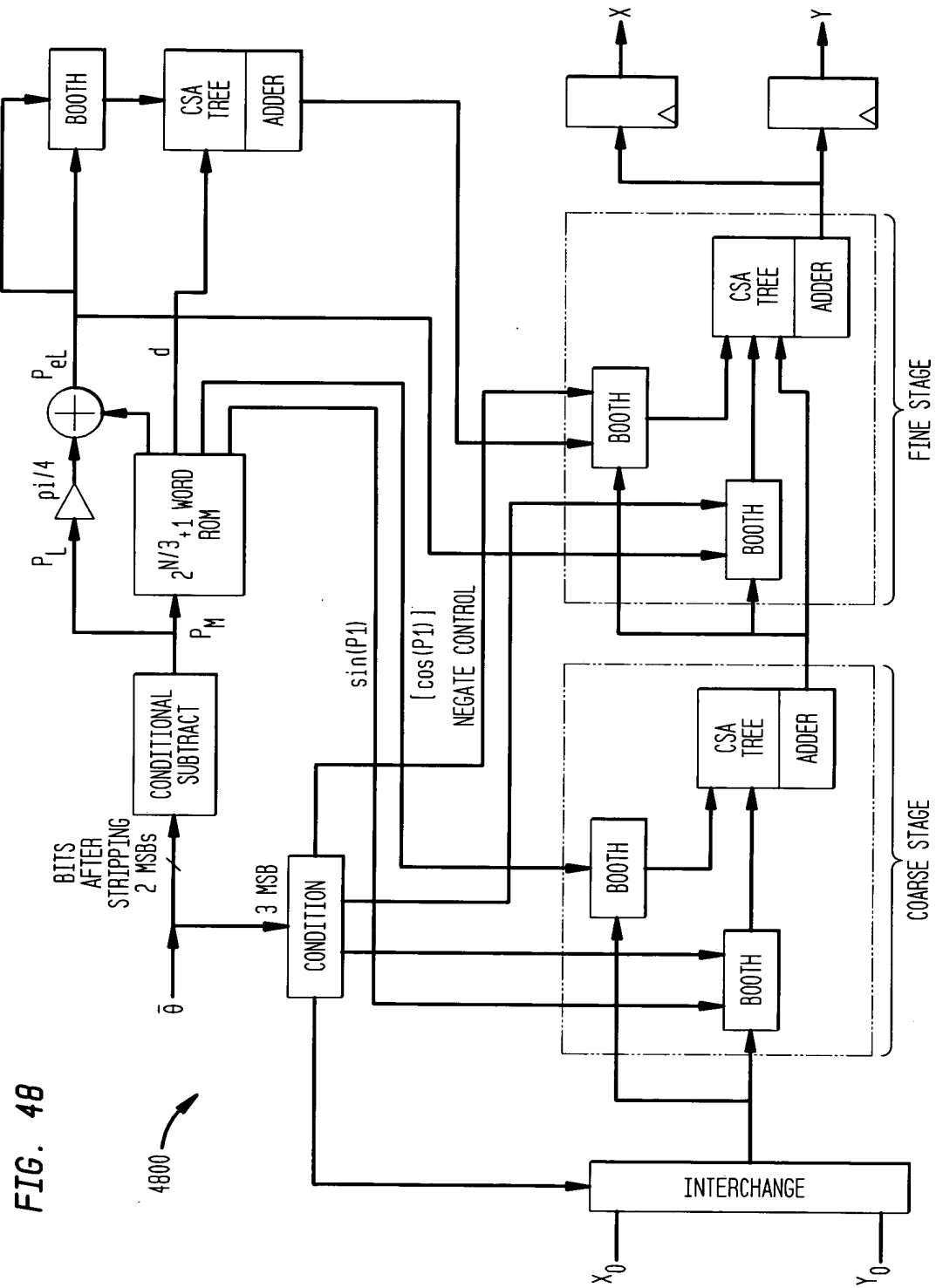


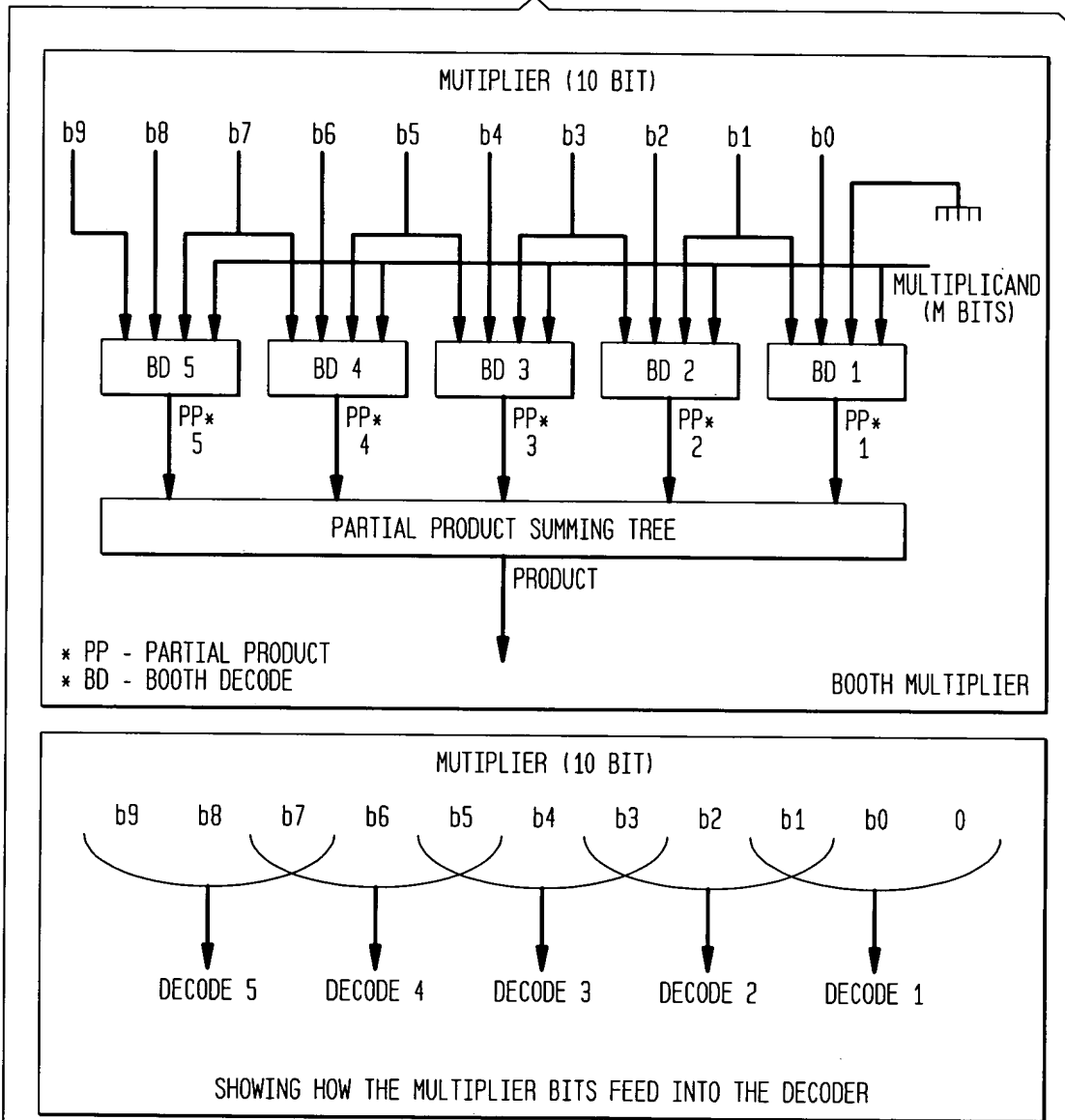
FIG. 47

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FIG. 49



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5000 **FIG. 50**

ORIGINAL BOOTH TABLE

5002

b2	b1	b0	PP
0	0	0	0*A
0	0	1	1*A
0	1	0	1*A
0	1	1	2*A
1	0	0	-2*A
1	0	1	-1*A
1	1	0	-1*A
1	1	1	0*A

5100 **FIG. 51**

NEGATING BOOTH TABLE

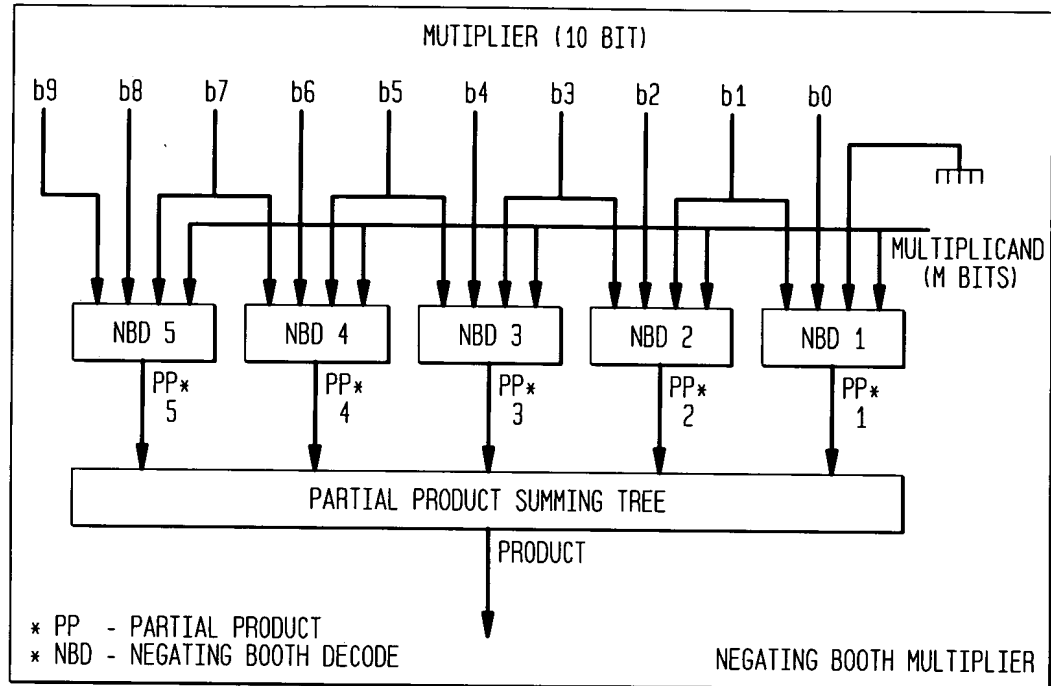
5102

b2	b1	b0	PP
0	0	0	0*A
0	0	1	-1*A
0	1	0	-1*A
0	1	1	-2*A
1	0	0	2*A
1	0	1	1*A
1	1	0	1*A
1	1	1	0*A

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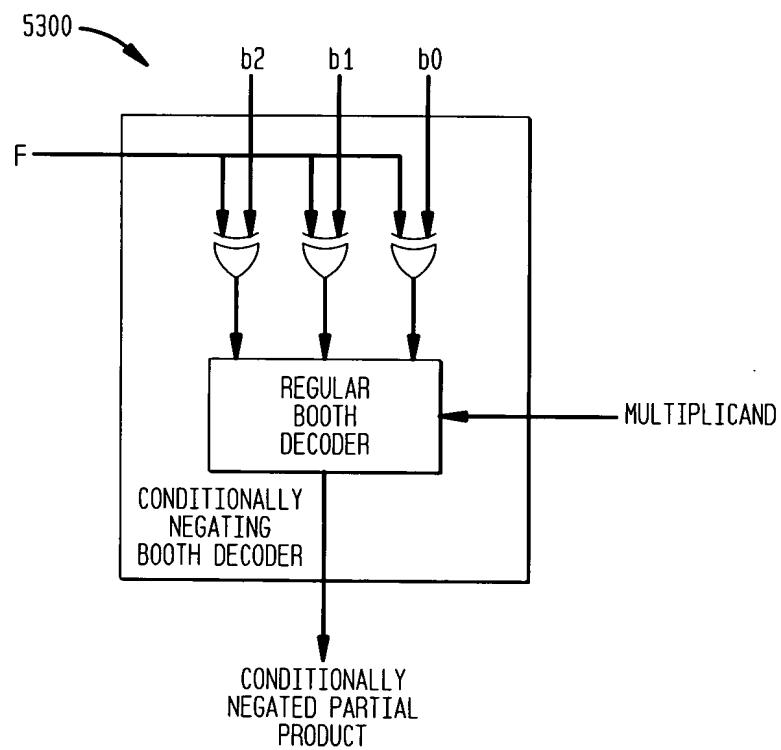
FIG. 52

5200



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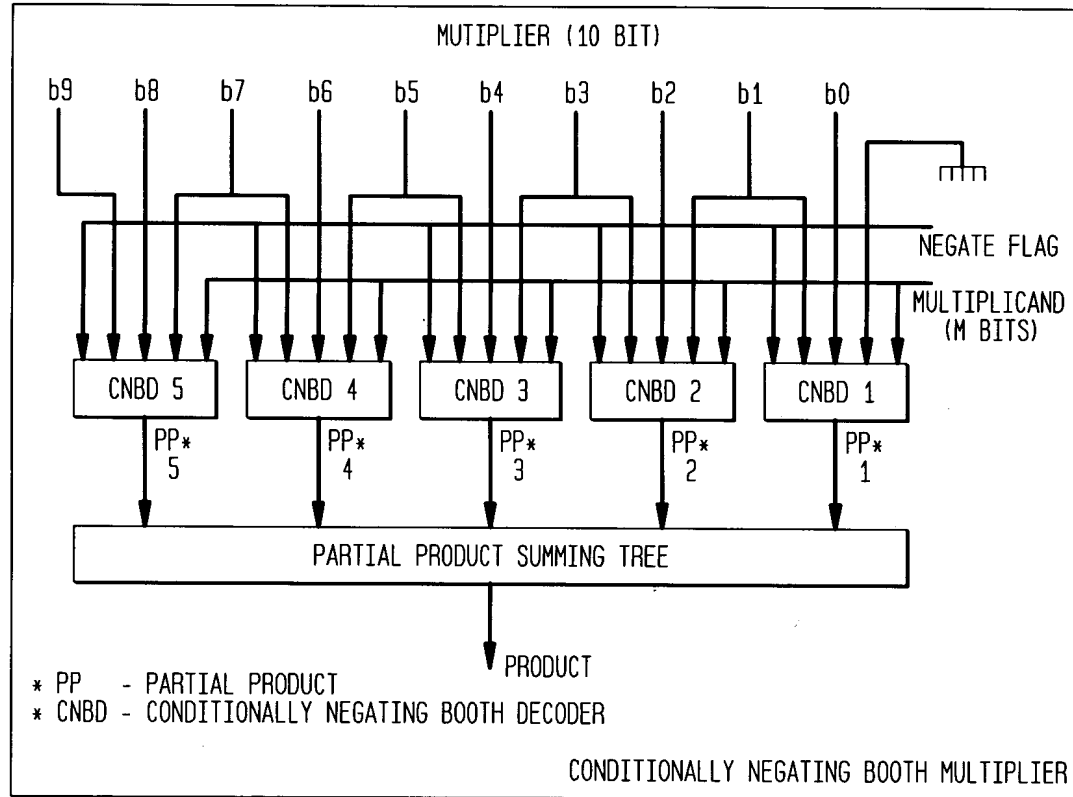
FIG. 53



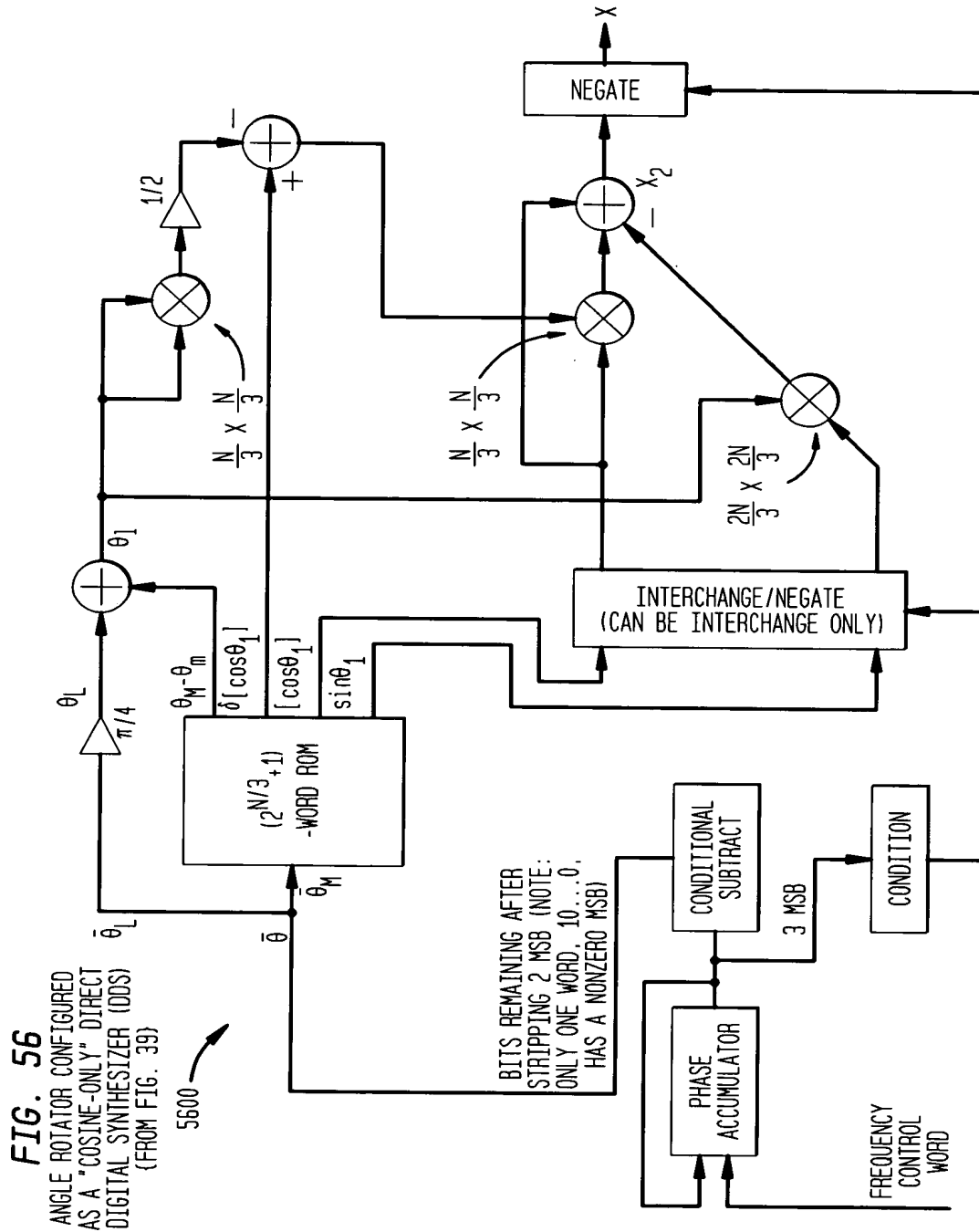
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FIG. 54

5400



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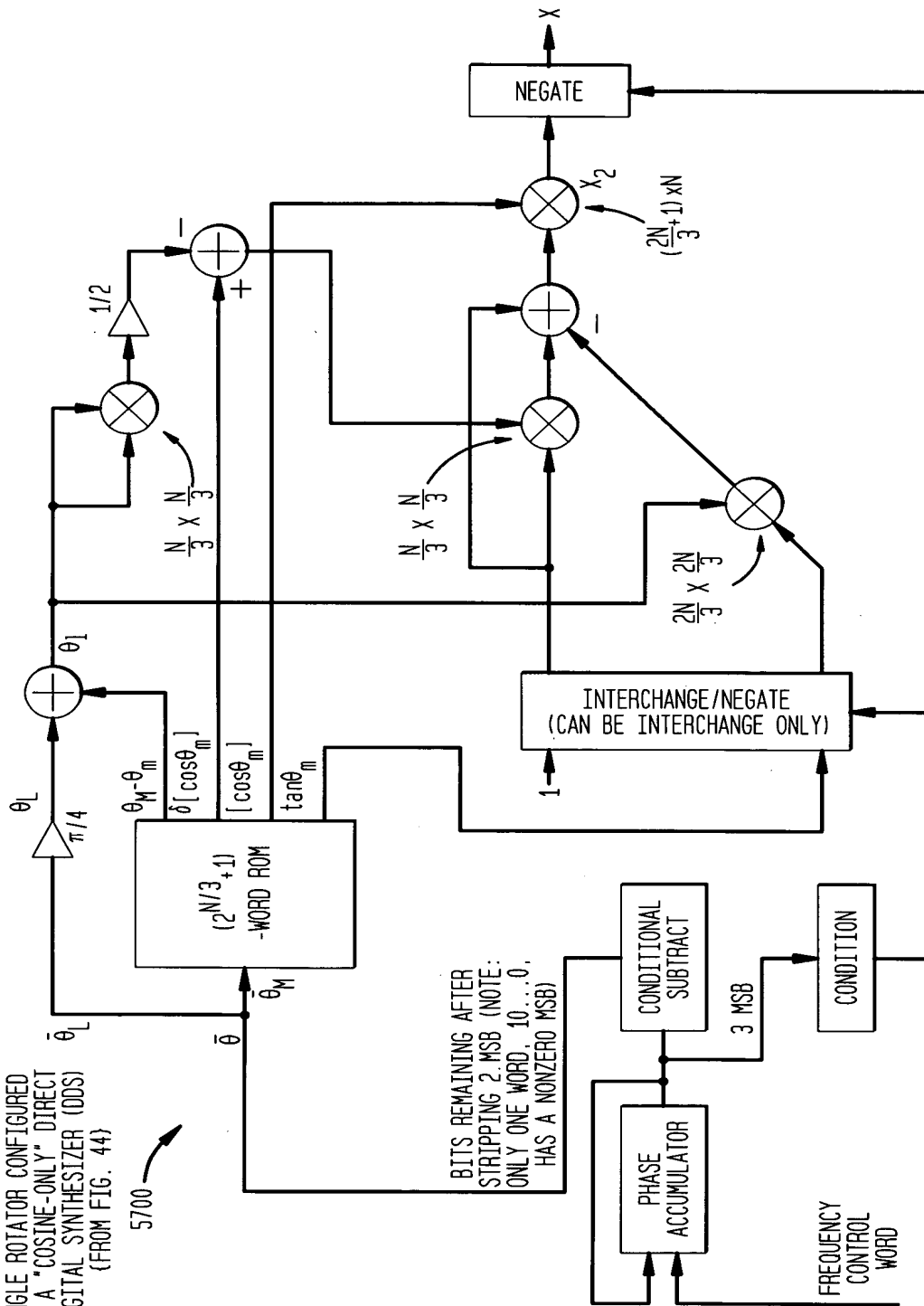


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FIG. 57

ANGLE ROTATOR CONFIGURED
 AS A "COSINE-ONLY" DIRECT
 DIGITAL SYNTHESIZER (DDS)
 (FROM FIG. 44)

5700



BITS REMAINING AFTER
 STRIPPING 2 MSB (NOTE:
 ONLY ONE WORD, 10...0,
 HAS A NONZERO MSB)

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FIG. 58
 COMMON PACKET FORMAT



FIG. 59
 THE SIMPLIFIED SYSTEM MODEL

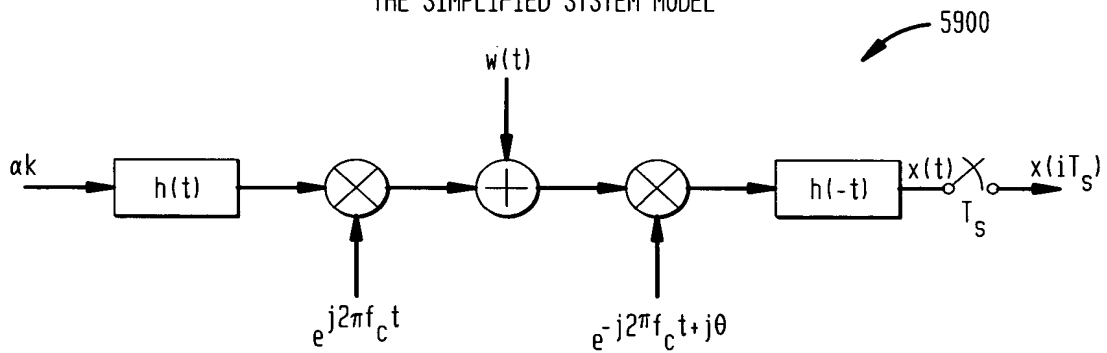


FIG. 60
 MEAN VALUES OF THE PREAMBLE CORRELATOR OUTPUT, FOR $\theta=0$

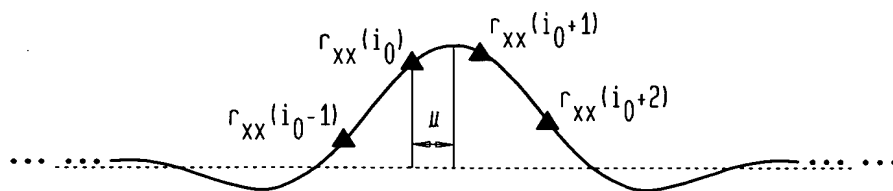
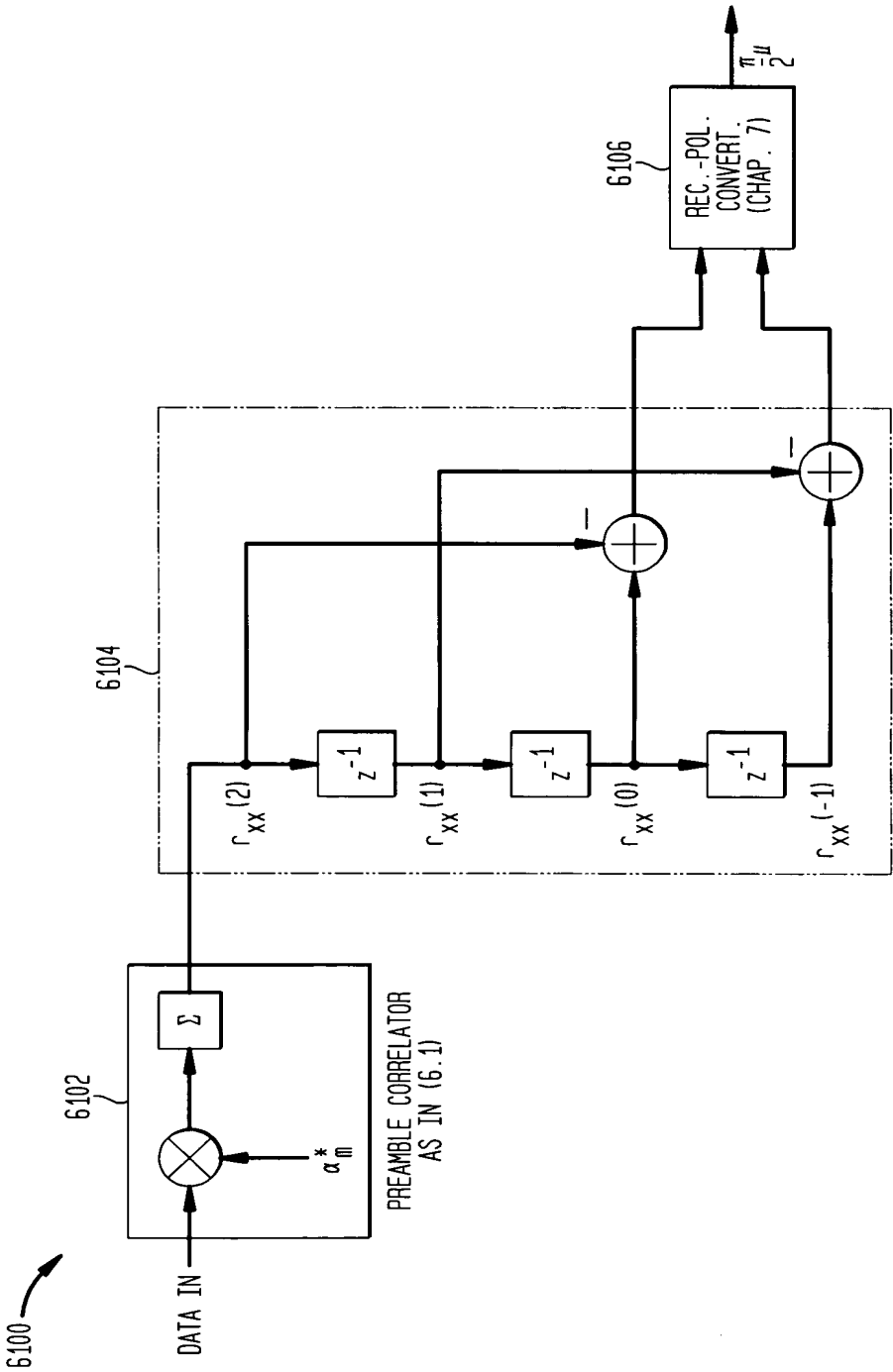


FIG. 61
PRELIMINARY SYMBOL-TIMING ESTIMATION STRUCTURE



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FIG. 62

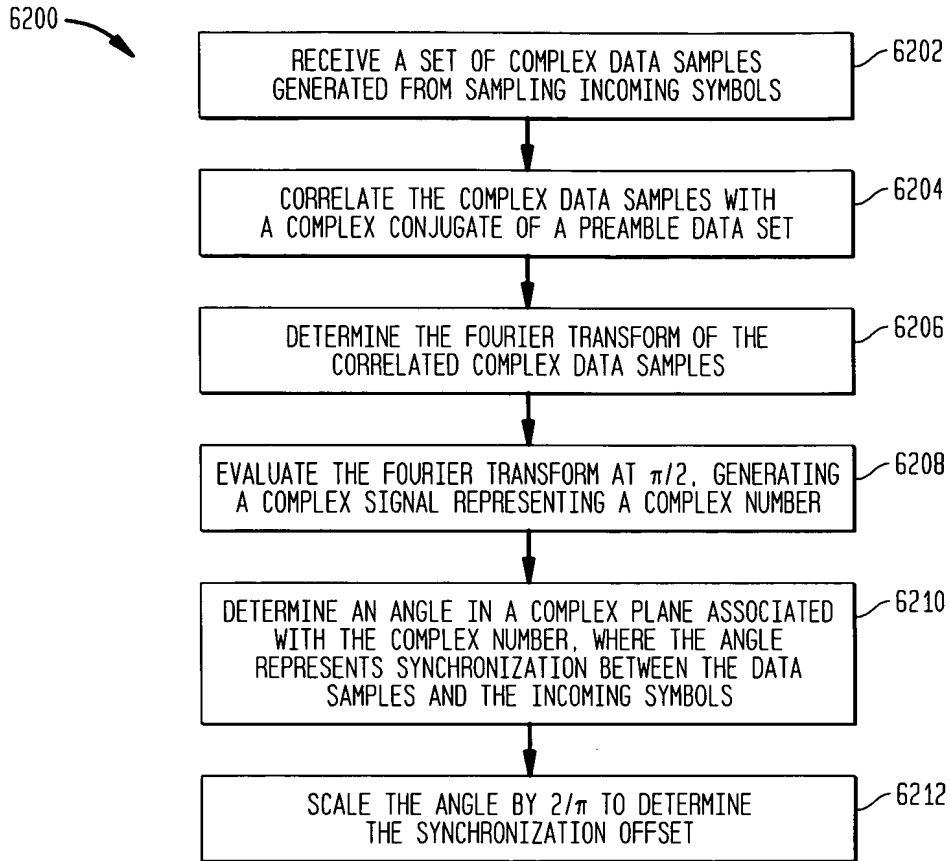


FIG. 63

BIAS DUE TO TRUNCATION

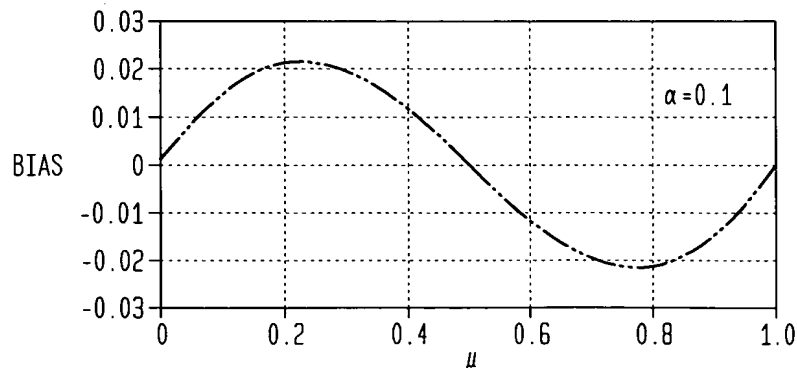


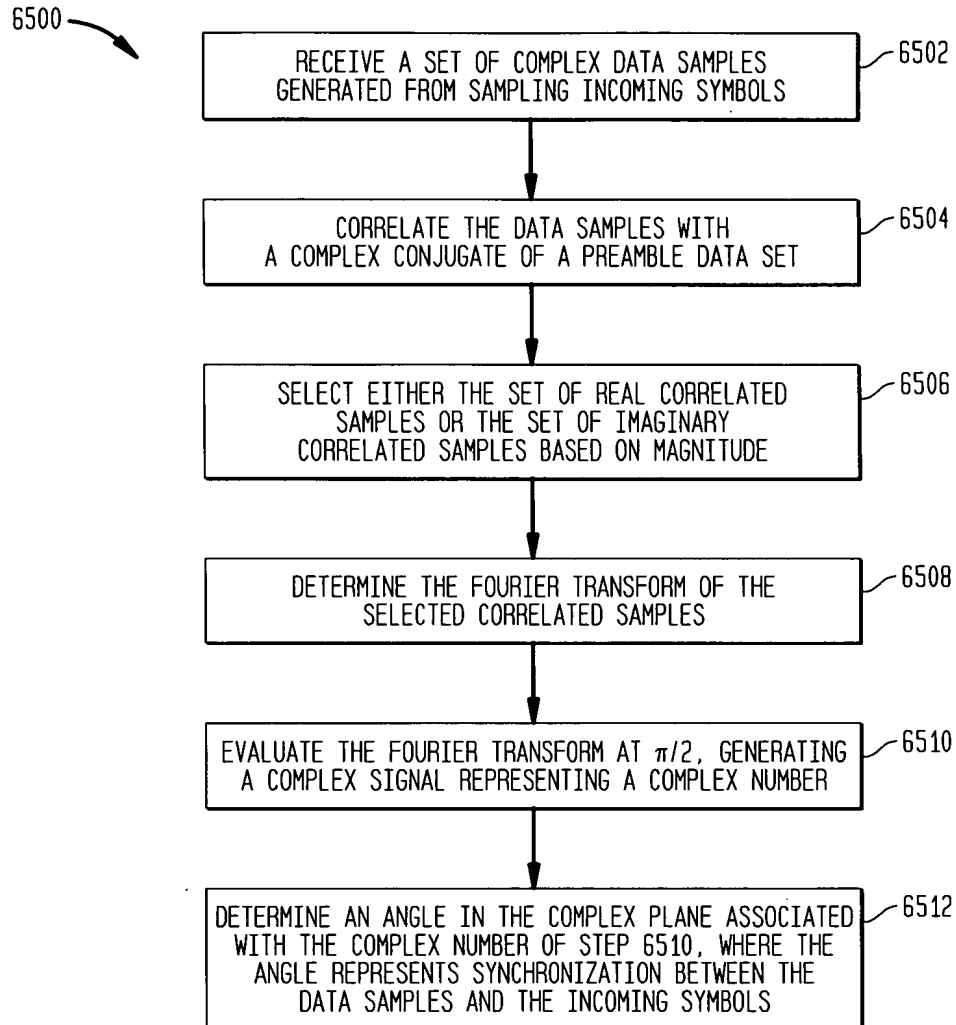
FIG. 64



PREAMBLE CORRELATOR (6.1)

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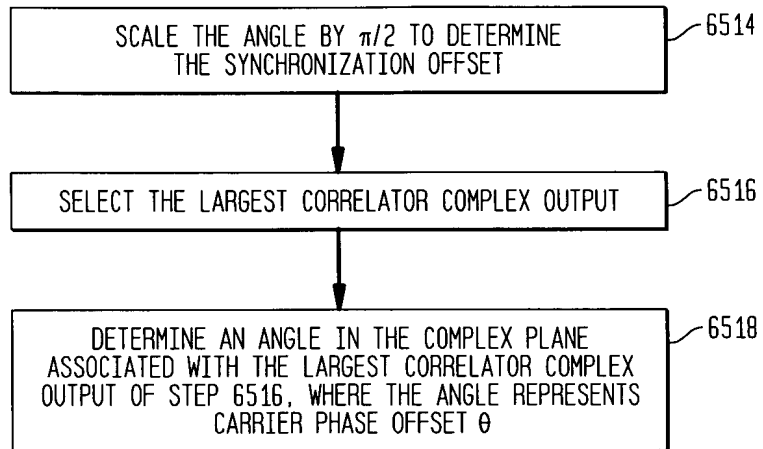
FIG. 65A



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6500 (CONT.)

FIG. 65B



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FIG. 66

TIMING JITTER VARIANCE, $\alpha=0.4$

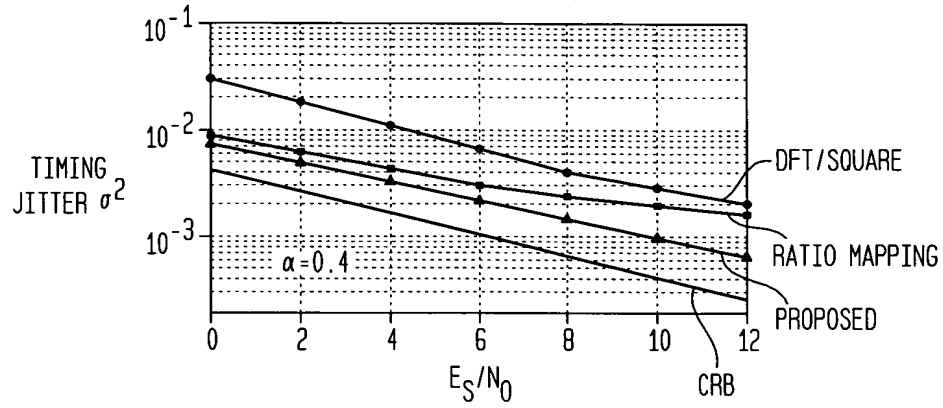


FIG. 67

TIMING JITTER VARIANCE, $\alpha=0.1$

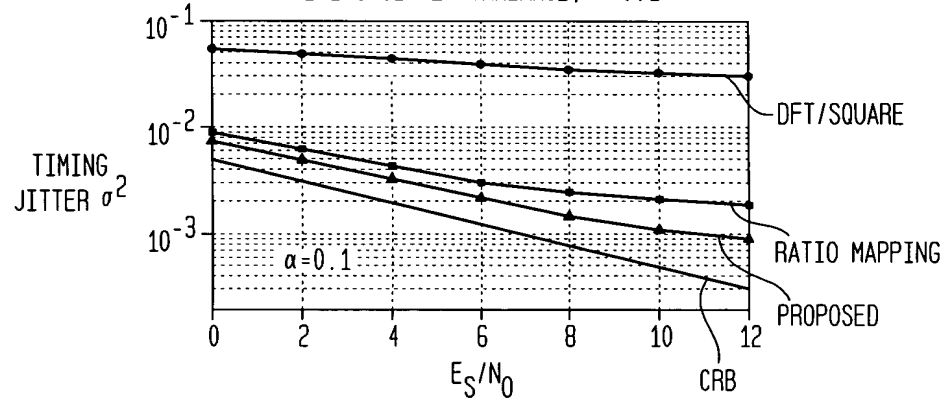
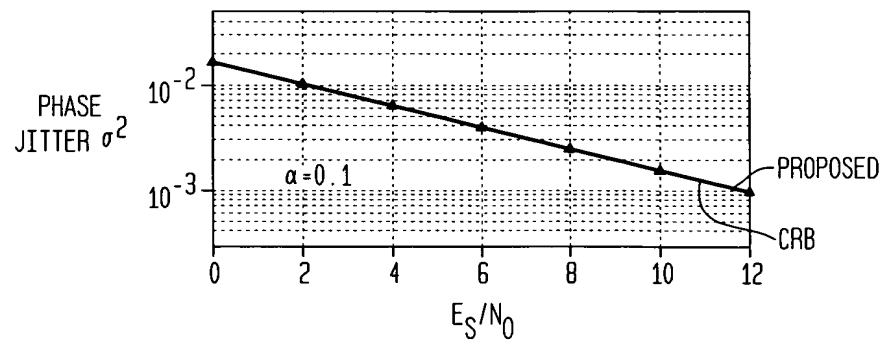


FIG. 68

PHASE JITTER VARIANCE, $\alpha=0.1$



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FIG. 69
 CARTESIAN TO POLAR CONVERSION

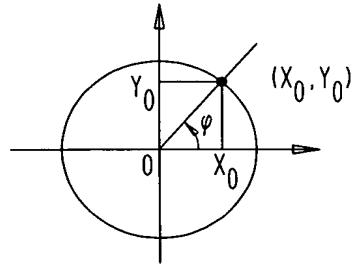


FIG. 70A
 USING NEWTON-RAPHSON ITERATION TO FIND $1/X_1$

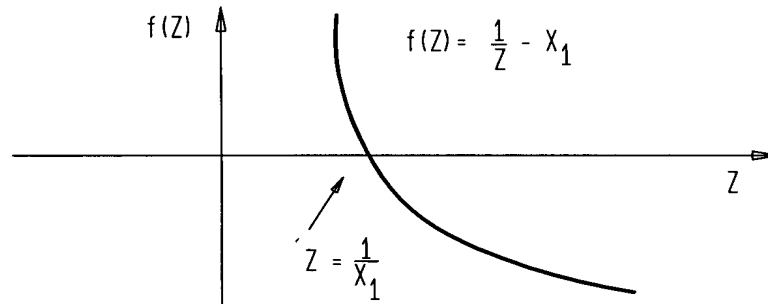
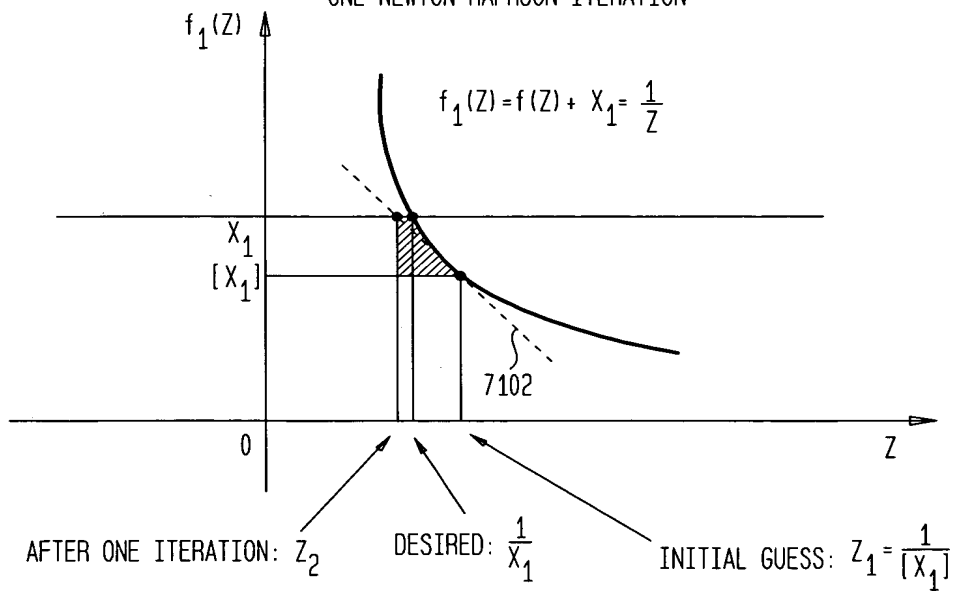
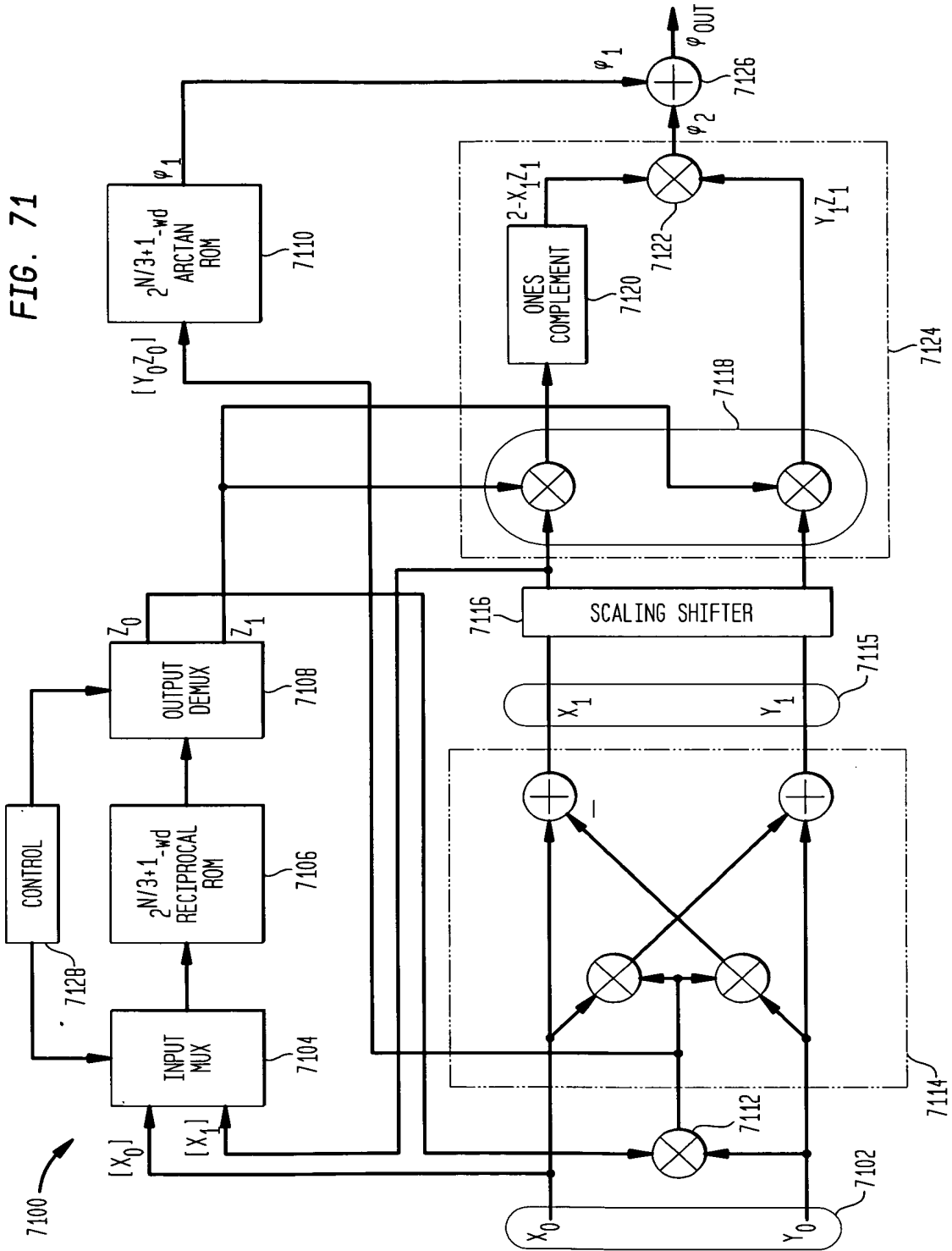


FIG. 70B
 ONE NEWTON-RAPHSON ITERATION



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FIG. 72

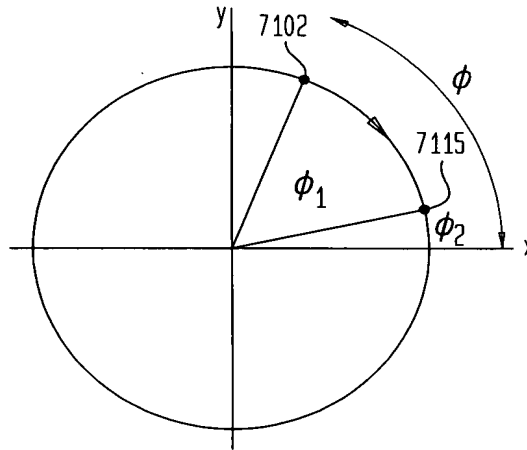
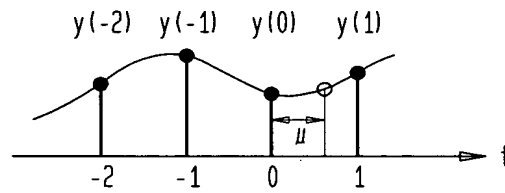


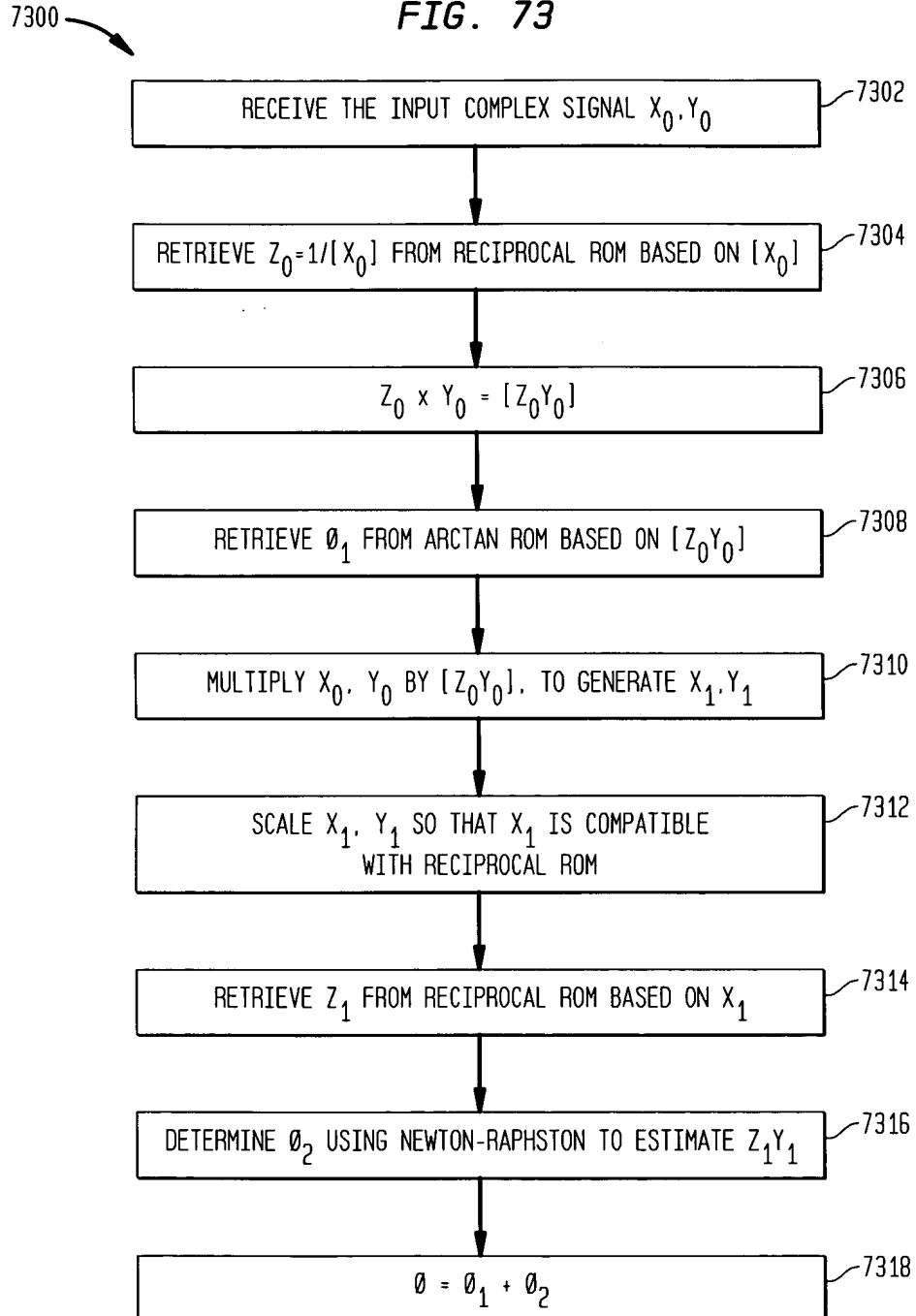
FIG. 74

INTERPOLATION IN A NON-CENTER INTERVAL



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FIG. 73



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FIG. 75A
IMPULSE RESPONSES OF THE NON-CENTER-INTERVAL
INTERPOLATION FILTER BEFORE OPTIMIZATION

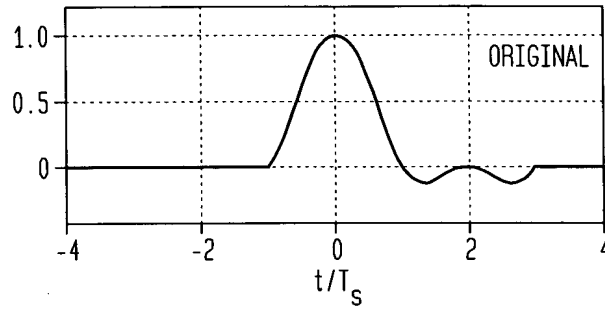
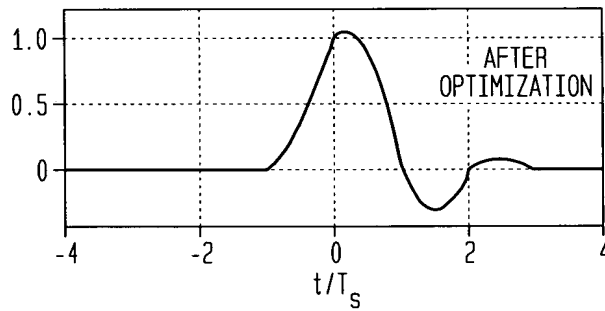


FIG. 75B
IMPULSE RESPONSES OF THE NON-CENTER-INTERVAL
INTERPOLATION FILTER AFTER OPTIMIZATION



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FIG. 76A

FREQUENCY RESPONSES OF THE NON-CENTER-INTERVAL INTERPOLATOR BEFORE OPTIMIZATION

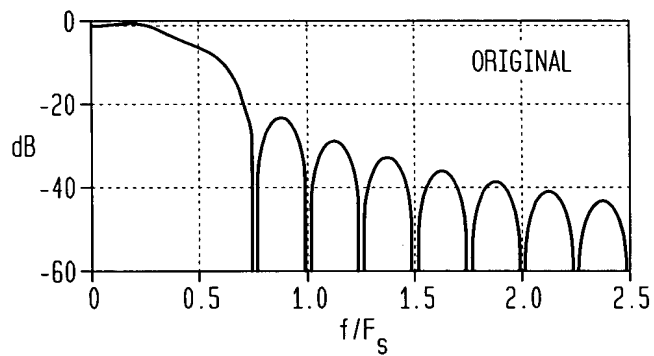
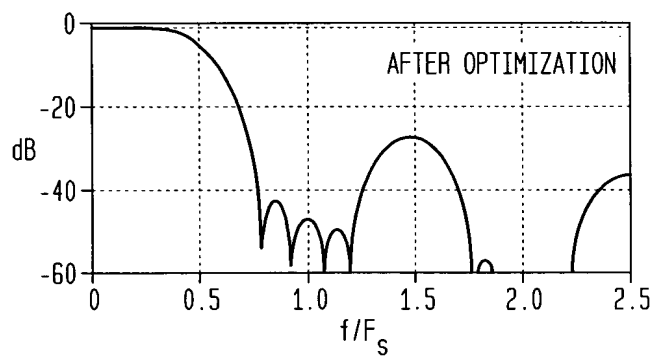


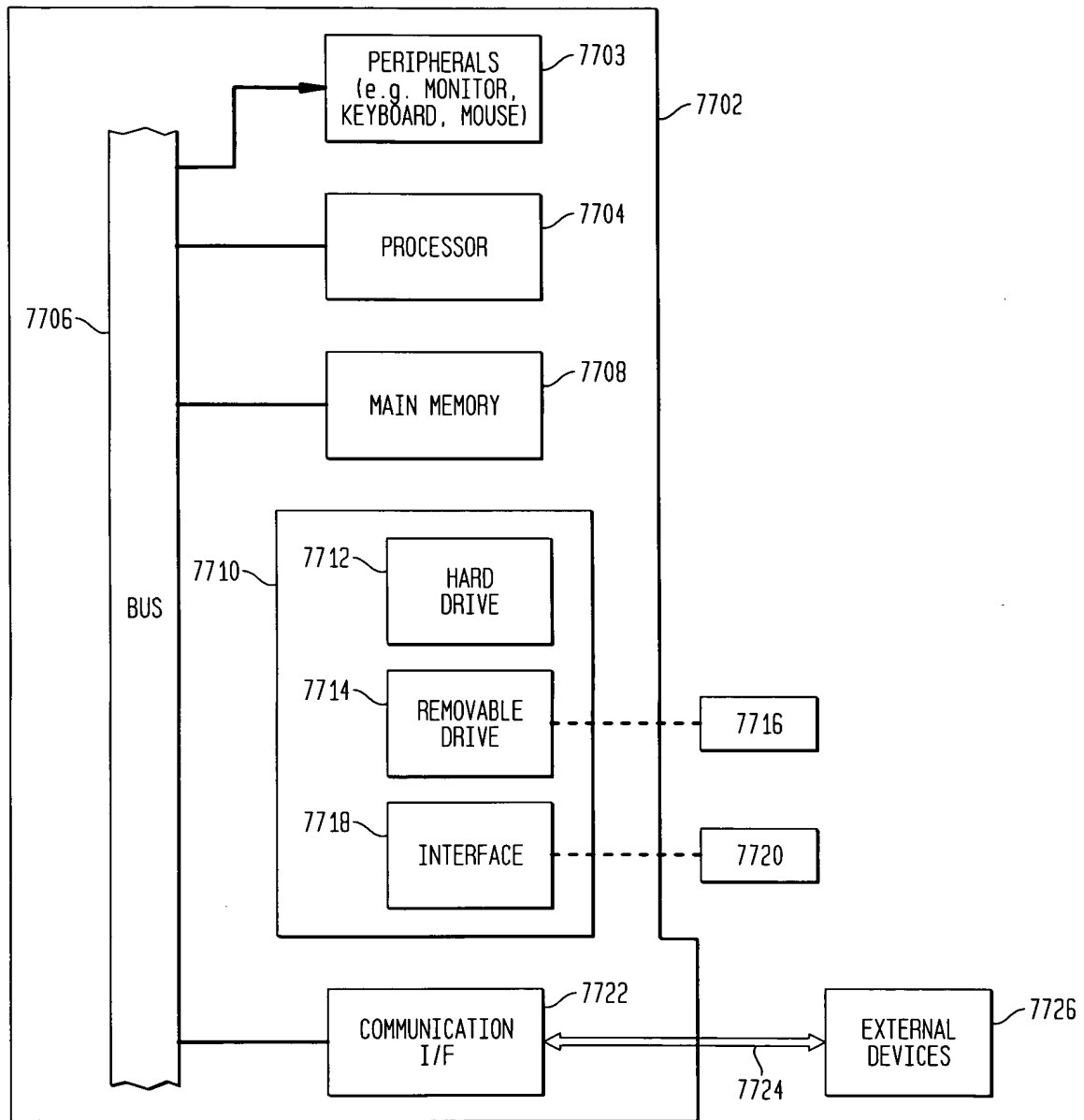
FIG. 76B

FREQUENCY RESPONSES OF THE NON-CENTER-INTERVAL INTERPOLATOR AFTER OPTIMIZATION



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FIG. 77



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FIG. 78
 DATA RATE EXPANSION CIRCUIT

